Telephony.

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Independent Telephone Men

By R. G. Shelden

HARRY D. CRITCHFIELD, who obtained the Independent telephone franchise in Milwaukee, was born in Knox county, Ohio, February 15, 1862. While in Wyoming, where he went for his health, Mr. Critchfield read law, and in 1889 was admitted to the bar of Ohio. He opened an office at Mt. Vernon, and was elected city attorney two terms. He continued to practice law in Mt. Vernon until 1897, during which time he successfully conducted litigation involving the largest sum ever known in the courts of that county.

Harry D. Critchfield.

Mr. Critchfield became interested in the Independent telephone movement and with others organized the Mt. Vernon Telephone Company and built an Independent plant, which began giving service July 1, 1895. In 1895 the Ohio Independent Telephone Association was organized, and Mr. Critchfield was elected secretary. In 1896 he was chairman of the committee on organization of the Independent Telephone Association of America and led the fight for equal representation at Detroit in June of that year. He was elected a member of the advisory board of the National association at that time, and has been a member of that body continuously, with the exception of two years while interested in the manufacturing end of the business. He was also general counsel for the National association from its organization in 1896 until 1902, and was active in and probably more familiar with the Berliner and Carty patent litigation than any other living Independent, and to him, as much as to any other man, was due the successful outcome of those suits. In 1898 he moved to Cleveland, Ohio, where he became general counsel for the Federal Telephone Company. In December, 1902, he removed to Chicago and became general counsel for the Automatic Electric Company, in which capacity he served until April, 1905. While associated with the Federal Telephone Company, he organized the Columbus Citizens' Telephone Company, the Dayton Home Telephone Company and numerous other Independent companies, and was one of the leading spirits in the development of the largest group of Independent telephone properties in the United States, known as the Everett-Moore properties.

In March, 1906, he removed to Milwaukee, Wisconsin, where he organized the Milwaukee Independent Telephone Company, and is now preparing to begin constructing the plant in that city during the coming spring.

He is also president of the Wisconsin Independent Telephone Association, a member of the executive committee of the International association and a director and voting trustee of the Telepost Company. Mr. Critchfield has an extensive acquaintance and is recognized as a man of strict integrity. He is known as one of "The Old Guard" in the Independent field, is both a diplomat and a fighter and has been active from the beginning in developing and maintaining the integrity of the Independent movement. As a matter of fact, few men have done as much for the industry as has Harry D. Critchfield.

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Editorial Department

THE KELLOGG DECISION.

IMMEDIATELY following the editorial pages will be found the Kellogg decree and decision as handed down by Judge Windes. This decision is a clean-cut victory for the Independents, but through the usual Bell trickery a supersedeas has been granted, which will tie the case up for another six months. In the meantime the Kellogg Switchboard and Supply Company is in the possession of the Bell management and must be considered as Bell by every Independent Telephone man. *Until a final decision is reached* TELEPHONY *must brand the Kellogg company as a Bell manufacturing concern not entitled to the support of any loyal Independent.*

USE ASSOCIATION STAMPS.

EVERY Independent operating telephone company in the United States should see that association stamps are on every invoice received for goods purchased. This will enable the International association to secure sufficient revenue to properly carry on its work. In a circular letter to the Independent telephone operating telephone companies of the United States and Canada President Lindemuth of the International association says:

Your attention is directed to the following copy of resolution adopted by the association at its last convention, and your co-operation solicited in making the trade-mark plan outlined effective as a revenue producer. To that end you are respectfully urged to bring this matter to the attention of the manufacturing and supply concerns with whom you do business, requesting them to affix stamps, in accordance with the provision of the resolution, to all bills and invoices rendered.

The extension and development of the Independent telephone field creates a market for telephone supplies, and it is just and proper that all manufacturers of and dealers in telephone equipment and material should contribute their just proportion towards the maintenance of the International association. Recognizing this fact, and desiring that the association work be continued, it has been customary for these interests to contribute from time to time to the association funds. Heretofore, however, there has been no fixed basis for such contributions and no means provided by which every operating company might know at once without investigation who are assisting to support their association.

The plan proposed offers an equitable basis for contributions in proportion to the actual amount of business done with Independent operating companies, at the same time enabling such companies to know immediately upon receipt of invoices whether the concerns with whom they are dealing are doing their share in carrying on the organization work.

Previous to the adoption of the resolution this plan was taken up with as many as possible of the manufacturing and supply concerns, receiving their approval as being equitable and practical, and the association was assured of the support of such concerns in the event of the plan being adopted. Independent telephone publications will co-operate in like manner.

While the respective amounts contributed by the various concerns will be so small as to be in no sense a burden, the aggregate sum, it is expected, will be sufficient to put the association upon a practical working basis, affording adequate compensation to the executive officers elected, so that they may devote all, or a large part of their time to the interests of the organization. The association has been regularly incorporated under the laws of the state of Illinois, thus giving it a legal existence.

From information obtained, we feel that we may safely count upon the co-operation of the manufacturers, supply and material dealers, if the operating companies will only insist upon the use of the trade-mark stamps. These may be obtained in any quantity from your state association or the International association headquarters. Your state association will furnish you on request suitable rubber stamp for use on orders and invoices. Refer all inquiries regarding the plan to this office.

The resolution referred to in President Lindemuth's letter which was passed at the Chicago convention is as follows:

Be it Resolved, that this association have prepared and copyrighted association stamps in denominations of 1c, 5c, 10c, 25c, 50c and $1.00, which will be sold at par to all strictly Independent manufacturers of and dealers in telephone apparatus, equipment, wire, cable, poles and other telephone material, and to publishers of Independent telephone journals and magazines; and that all such manufacturers, supply dealers and publishers be required to affix such stamps to all invoices and bills for goods or supplies sold to Independent operating companies, and to advertising and subscription bills of said journals, in proportion of one-tenth of one percent on invoices or bills amounting to $500 or less, and one-twentieth of one per cent on all bills or invoices for amounts in excess of $500.

Be it Further Resolved, that all Independent telephone companies receiving bills or invoices not properly stamped are requested to return same before payment, with the request that stamps be affixed and cancelled, in accordance with provisions of this resolution, and that all Independent telephone companies be requested to co-operate with the International association in carrying this resolution into effect, and that the state and provincial associations be requested to assist in such work and that stamps be furnished such associations for sale and that they be paid a commission of twenty-five per cent on all stamps handled by them. Also that such association be requested to furnish to each of their companies a rubber stamp containing the words:

"We are members of the state association. Please affix stamps," which, when placed upon any order, invoice or bill shall be sufficient notification and guaranty to any such manufacturer, dealer or publisher that the stamps are required and must be affixed to such bill.

And be it Further Resolved, that any such manufacturer, dealer or publisher failing or refusing to use the association stamps as above provided, shall be denied membership in and the privilege of the International association and its annual convention.

A CHANGE OF TUNE.

OF ALL the subsidiary "feeders" of the Bell telephone octopus none in the past has been more arrogant toward public officers or more oppressive in its treatment of the people than the Cumberland Telephone and Telegraph Company, which operates in Tennessee, Mississippi and other southern states. Long after the Bell licensees in other sections of the country began to manifest a desire to cultivate public opinion and win the good will of telephone users, the Cumberland concern remained un-reconstructed and continued its public-be-d——d policy. But now a change is reported. A man named Fletcher is said to be responsible for the fact that the Cumberland is not stepping quite so high just now and is singing on a lower scale. Mr. Fletcher is the attorney-general of the state of Mississippi and recently had the hardihood to file a suit to cancel the charter of the Cumberland company and prevent it from doing business in the state because of an alleged violation of the anti-trust law.

An illustration of the unprecedented meekness of the Cumberland just at this time is furnished by the fact that the company recently has appealed to the legislature to make a thorough investigation of its affairs. Hitherto any suggestion that there be a public investigation would have been indignantly repelled by the Cumberland, which consistently denied any right by an outsider to demand any information about its concerns. Alarmed at the attorney-general's suit, however, the Bell licensee begs the legisla-

ture to inquire into its affairs with a view to determine whether rates and charges have been fair and just, whether there has been unjust discrimination, whether the returns to the stockholders have been equitable, and whether the charges and practices of the company and the payment of dividends have been entirely fair and just to the public.

The company also offers to submit all of its original records, vouchers, receipts, books and papers for the scrutiny of experts who may be employed by the legislature or the railroad commission, and to cheerfully abide by the conclusion that may be reached as a result of this probing.

"In fact," as one of the Mississippi newspapers says in surprise, "the Cumberland is on its knees before the legislature."

Changes of moment are constantly occurring in the telephone world, but none is more significant than this change of front on the part of the haughty Cumberland, which is found appealing to a public body for an investigation which in years past it would permit no one even to hint was necessary or advisable. The signs, therefore, are strong that the Cumberland Bell entertains a wholesome fear that Attorney-General Fletcher's lawsuit is something more than a bluff.

THE GOING'S GOOD.

TELEPHONY has always shown an optimistic spirit. Our belief in the continued prosperity of the American people is deep rooted, and based on our vast natural resources. We invite our readers' attention to a monograph in this issue by Frank G. Jones, which concerns panics, and "near" panics, and is well worth reading. Mr. Jones holds that the "going is good" and that we should not be frightened by ghost stories.

A recent editorial in Judge shows up the recent financial flurry in a concise and able manner. The editor says: "That there is pretty hard sledding these days is a remark commonly and carelessly made. As a matter of fact, most of us who are accustomed to pulling our own sleds are getting along very well indeed, and whistling over the job. Those who have been hardest hit by the late panic—and veterans of '53 laugh at our use of the word in connection with last year's flurry—are such members of the community as have been accustomed to sit on their sleds and let someone else pull them. We are so interdependent a community that when one class suffers, all suffer. But on the whole this has not been a poor man's hard times. If everyone would get busy pulling his own sled, and not stand by the wayside throwing snow-balls at industry nor stand still in the middle of the runway and kick holes in it, there would be fine sleighing. Cheer up, neighbors, as the farmers say, the going is good. Come out of storage and let us hear a few more sleigh-bells!"

TELEPHONY has been pulling its own sled these many years and will continue to do so. It is needless to say we find the "going good."

CONCERNING POSTOFFICE TELEPHONES.

THERE was a time—and not so very long ago—when the Bell monopoly had all its own way about the installation of telephones in United States postoffices. If a telephone was to be placed in a federal building the Bell had the influence to compel the selection of a Bell instrument. The octopus had the right of way at Washington and its interests were served by government officials who might have been in better business. But times are changed. In company with other trusts, the Bell combine has had to admit that others have equal rights, and the national administration has recognized the fact that there are Independent companies in the telephone business who furnish just as good service, and who represent a much greater proportion of citizens than the Bell octopus.

All of which leads up to an interesting situation that exists at Galesburg, Ill. There is a thriving Independent telephone company at that place, which has four times as many subscribers as the local Bell concern. When the question came up about placing a telephone in the postoffice the people demanded that the Independent company be patronized. Just to assist in bringing this about the stockholders of the Independent company adopted resolutions touching the matter. Inasmuch as a similar situation may arise in other cities and towns and as the resolutions furnish an effective means for getting at "the milk in the cocoanut," they are given below:

"Whereas, It has come to our attention that up to this time it has seemed imposible to secure the installation of an Independent telephone in the postoffice at Galesburg, Ill., and

"Whereas, It is our understanding that the postoffice has ruled that the local postmaster shall install such telephone in their offices as shall meet the requirements of the greater number of the patrons of the office, and

"Whereas, In Galesburg among the patrons of the local postoffice four patrons use the Independent telephone to one who uses the Bell telephone, therefore

"*Be it resolved,* by the stockholders of the Galesburg Union Telephone Company, in annual meeting assembled, that the board of directors of said company be instructed to call this matter to the attention of the local postmaster at once and in case he refuses to install said telephone to take such further action as in their judgment will be best calculated to secure the installation of such Independent telephone."

A WORD FOR "CENTRAL."

WORDS of consideration for the telephone operator are found so seldom in the press that when a plea is made for the "hello girl" it is worth re-printing if only as a curiosity. We pluck the following blossom from a magazine called "The Rose Bush":

"A New York man was 'if-you-pleased and yes-sired' so politely by a telephone operator that he called up for the girl. It was so very unusual, he said. 'Unusual?' responded the manager. 'Certainly the operator's politeness is not more unusual than your own. I have been in this business a good many years, and you are the first man who ever took the trouble to say a good word to me for an operator. But complaints? Why, there seem to be a million women in this city who have nothing else to do.'

"It is no temper-soothing job—that which the telephone operator holds. She is held responsible not only for her own mistakes, but for the thousands of mistakes made by other people. You carelessly call for 1985 when what you really want is 1895, and because you get the wrong party you petulantly blame the 'fool operator,' and upon your severely informing her that she gave you 1985 when you asked for 1895, and that if she ever does it again you will make complaint against her, you feel slighted because she does not say 'thank you.'

"You roughly jar your telephone and your nerves if she does not answer instantly; you think she is teasing you when she tells you the line you want is busy; and perhaps you more than half suspect she is listening to all you say over the line. She is a sadly misjudged girl. Her work is difficult and her errors marvelously few. She has no time for unnecessary words, though she is as polite as the public will permit her to be. She knows that you never think of her service except when it goes wrong, and never speak of her except to 'knock.' Yet she patiently does the best she can for you, and that is often better than you deserve. Don't imagine you are distinguishing yourself by complaining against her. Thousands have been ahead of you. But say a word in her favor at the right place and you stand alone with an approving conscience."

KELLOGG SUIT DECIDED

Judge Windes Hands Down a Sweeping Decision Annulling the Sale to the Bell Interests.

IMPORTANT developments in the litigation over the ownership of the Kellogg Switchboard & Supply Company have occurred during the last month. Judge Thomas G. Windes handed down a decision declaring the sale of the property to the Bell interests to be null and void and commanding the representatives of the Bell to transfer the stock back to its original owners and retire from the management of the company. True to its instinct the Bell monopoly is overlooking no means to prevent the execution of the court's decree. The Bell attorneys have obtained a writ of supersedeas from the branch appellate court of Illinois, which will suspend operations for some months.

Meanwhile the Kellogg company remains under the control of the Bell management, although to be sure the Bell interests are enjoined from exercising any influence upon said management. TELEPHONY will be glad to welcome the Kellogg company back into the Independent fold when the Bell has exhausted its legal tactics and is forced to keep "hands off." So long, however, as the Bell continues to control the Kellogg company it is wise for Independents to regard it as a Bell concern and act accordingly.

The vital importance of this case leads TELEPHONY to print in full both the decree and the decision handed down, as they give a complete history of this notable Bell conspiracy. Judge Windes' engrossed decree follows:

IN THE CIRCUIT COURT OF COOK COUNTY. Francis W. Dunbar, *et al*, vs. American Telephone & Telegraph Company, *et al*. In Chancery, 239,845-6,344.

This cause coming on for final hearing upon the amended bill of complaint herein, the first supplemental bill herein, the second supplemental bill as amended, and upon the answers thereto of the defendants American Telephone & Telegraph Company, Western Electric Company, Kellogg Switchboard & Supply Company, Enos M. Barton, Wallace L. DeWolf, Milo G. Kellogg, Wallace L. DeWolf, and Lucy Ellen Bell, trustees of the estate of Calvin DeWolf, deceased, Edgar A. White, L. W. Epps, Mrs. Lucy E. Bell, Emerson H. Brush, Clarence Buckingham, Mrs. Katherine W. Wright, Hopkins J. Hanford, Scott Hanford, Adolphus Busch, Charles Nagel, Joseph C. Belden, Mrs. Amanda W. Belden, and Anna W. Pool, and upon replications of complainants to said several answers, and defaults having been duly taken and entered herein as against the defendants Frederick P. Fish, Anna P. Kellogg, James G. Kellogg, Mary Frances Kellogg, trustees of the estate of Calvin DeWolf, deceased, LeRoy D. Kellogg, George F. Baker, Franz J. Dommerque, and Frances D. Kellogg, and the court having heard the evidence of the respective parties which was taken orally and in open court, except such parts thereof as were taken by deposition, and having also heard arguments of counsel for the respective parties, and being fully advised in the premises, finds:

1. That this court has jurisdiction of the subject-matter and of all the parties to this suit.

2. That the Kellogg Switchboard & Supply Company (hereinafter called the Kellogg company) is a corporation organized in 1897 under the laws of Illinois for the purposes stated in the first paragraph of said amended bill, that the total capital stock of said company consists of 5,000 shares of $100 each, and at the time of the sales of stock to said American Telephone & Telegraph Company, as hereinafter stated, and thence until, and at the time of the filing of the bill herein, complainant Dunbar was and still is the owner of 208 shares of said stock, and complainant Miller then was the owner of sixty shares thereof, and complainant Burlingame then was the owner of ten shares of said stock, and that immediately prior to the pretended sale of stock hereinafter referred to in January, 1902, defendant Milo G. Kellogg was the owner of 3,306 shares of said stock; defendant Buckingham owned 262 shares thereof, defendant DeWolf owned 203 shares thereof, defendant Katherine W. Wright owned twelve shares thereof, defendant Busch owned 215 shares thereof, defendant Nagel owned forty-two shares thereof, defendant Hopkins J. Hanford owned 259 shares thereof, defendant Scott Hanford twelve shares thereof, and that all the balance of said stock of said Kellogg company (except thirty shares which was in the treasury of said company), was then owned by the persons mentioned, and substantially in the proportions stated, in paragraph 1 of said bill; and that the persons named as such in paragraph 1, of said bill were at that date the directors and officers of said Kellogg company.

3. That all the facts specially alleged in paragraphs II to XI inclusive, of said amended bill, are substantially proven to be true, except the allegations of paragraph II thereof, that the profits of the Kellogg company in 1901 were more than $200,000; and the allegations of paragraph VI thereof, that the tolls charged by the American company or any of its said licensees were unreasonably high and exorbitant; and that said Kellogg company since 1897 has been engaged in the business of manufacturing telephones and telephone apparatus and appliances, for many of which numerous patents have been issued which were at said time of said alleged sale owned by said Kellogg company; that its said business had, prior to that date, been prosperous, and the volume thereof then was increasing, but that its business was then confined mainly to sales of its manufactured products to local and long distance telephone companies throughout the country, which were in direct competition with said American Telephone & Telegraph Company and its licensee companies hereinafter referred to.

4. That said American Telephone & Telegraph Company (hereinafter called the American company), is a corporation organized under the laws of New York, and since the year 1899 has been doing business in the state of Illinois and most of the other states of the Union, it having in the year 1899 succeeded to the business and properties of the American Bell Telephone Company of Boston; that said American company has since said time itself operated a system of telephone wires connecting with each other the local telephone companies which are its own licensees as hereinafter defined, and which operate a local telephone system in the numerous cities and towns throughout the United States; such telephone service so operated directly by said American company being commonly known as the long distance telephone service.

5. That said American company has since the year 1899 also owned in many cases a majority of the capital stocks of many other companies rendering local telephone service in different cities and places throughout the United States, and in some cases has during said time owned stock (but less than a majority) in other local telephone companies; that said American company has also owned since said year at least sixty per cent of the capital stock of the Western Electric Company, an Illinois corporation organized in the year 1882 for, and whose business has since the year 1899 been, mainly the manufacture of multiple and other switchboard and electric and telephone apparatus (some of which have been covered by patents owned by it, or said American Bell company or said American company), for said American company in its long distance telephone business, and also for said local telephone companies, stocks of which are and have been owned by said American company as above stated, said local companies being granted through licenses the right to use said appliances so covered by said patents to said American and Western Electric companies, and being commonly known as "licensee companies" of said American company, and that prior to said alleged sale in January, 1902, said Western Electric Company did not furnish or sell any of its patented telephone apparatus or appliances within the United States to any other person than said American company and its said licensee companies—said American company, its licensee companies and said Western Electric Company thus constituting the unitary system for rendering of long distance and local telephone service throughout the United States and to sundry persons in many different cities thereof, and that in January, 1902, and for some time prior thereto said defendant Fish was president of said American company and defendant Barton was president of said Western Electric Company.

6. That by reason of the original patents granted in this country to Alexander Graham Bell and subsequently acquired by said American Bell Telephone Company, said company and its licensee companies acquired and enjoyed an exclusive monopoly of the telephone business in the United States, but that soon after the expiration of the fundamental telephone patents in the year 1894, other rival companies began to be organized for the construction and operation of telephone systems in various cities and other places, which were not licensees of, or connected with, said American company, and that prior to January, 1902, the number of said Independent local telephone companies so created and in operation in the United States exceeded in number 4,000, which included telephone systems in many of the larger as well as many of the smaller cities of the country. That prior to January, 1902, other Independent companies have been organized for the rendering of long distance telephone service between the cities where said Independent local telephone companies were operated, and thereby said Independent telephone

companies and said Independent long distance telephone companies constituted another vast inter-communicating system for the furnishing not only of local, but of long distance, telephone service over a wide territory within the United States, and in January, 1902, and for a long period of time prior thereto, said system of said American company and its said licensee companies and said system of said Independent telephone companies constituted two rival organizations which during said time were in sharp competition with each other in the rendering of telephone service, both local and long distance, to the public throughout many parts of the United States.

7. That in and prior to January, 1902, most of the multiple switchboards and other appliances used in the construction of said exchanges and telephone systems of said Independent companies were manufactured by and purchased from the said Kellogg company and two other like companies knows as the Stromberg-Carlson Telephone Manufacturing Company and the American Electric Telephone Company, and that the business of said Kellogg company in furnishing said multiple switchboards to said Independent exchanges considerably exceeded that of either of said two other companies, and that multiple switchboards are essential to the best construction and most practical operation of telephone exchanges in cities exceeding 5,000 inhabitants.

8. That in November, 1901, said Milo G. Kellogg, who was then the president of said Kellogg company, was obliged, on account of ill health, to go to California, and before doing so said Kellogg gave to said DeWolf, his brother-in-law, a general power of attorney and the possession of the certificates of the 3,306 shares of the stock of said Kellogg company then owned by said Kellogg, and that on January 4, 1902, said DeWolf, acting under said power

Milo G. Kellogg, founder of the Kellogg Company.

of attorney, and during the absence, and without the knowledge, of said Kellogg, but at the suggestion of LeRoy D. Kellogg, a son of Milo G. Kellogg, executed with the defendant Barton, a written contract wherein said DeWolf agreed to sell and deliver to said Barton, and said Barton agreed to buy, not less than two-thirds of the total capital stock of said Kellogg company, said contract being correctly set out in the answer of defendant DeWolf to the original bill herein. That under and in pursuance of said contract, and about the 17th day of January, 1902, said DeWolf attempted to sell to said Barton, and did deliver (duly endorsed) to said Barton the certificates for the 3,306 shares of said stock belonging to said Milo G. Kellogg, and did also attempt to sell to said Barton and did deliver (duly endorsed) the stock certificates for the stock then owned, as above stated, by said Buckingham, DeWolf, Katherine W. Wright, constituting in all 3,783 shares, or more than two-thirds of the capital stock of said Kellogg company, and that in the purchase of said shares of stock said Barton acted, not in his own behalf, but in the behalf of, and as the agent of, said American company, which furnished to said Barton the money necessary to make said purchase; and that subsequently and prior to the 21st day of February, 1903, the said American company also attempted to purchase, and did receive the stock certificates for the

Francis W. Dunbar, the man who started the suit.

shares of stock owned by defendants Busch, and Nagel, as aforesaid, constituting 257 other shares of said stock of said Kellogg company, said purchase being made with the funds of, and by, said American company, and said American company about the same time attempted to purchase and did receive the certificates, and pay for the 271 shares owned by said Hopkins J. Hanford and Scott Hanford as aforesaid; and that said American company has not transferred or attempted to transfer any of said shares of stock to any other person, but still has in its possession and control the stock certificates representing all of said 4,311 shares, which it received from said sellers, or other certificates since issued in lieu thereof, the numbers, dates, names of parties to whom issued, and number of shares for which issued, of said shares now outstanding being as follows:

Date.	Number.	Name.	No. of shares.
Jan. 14, 1907:	199	Enos M. Barton	12
Dec. 10, 1906:	198	Enos M. Barton	3,771
Dec. 10, 1906:	197	William R. Driver	28
Dec. 10. 1906:	196	William R. Driver	100
Dec. 10, 1906:	195	William R. Driver	100
Dec. 10, 1906:	194	William R. Driver	100
Dec. 10, 1906:	193	William R. Driver	100
Dec. 10, 1906:	192	William R. Driver	100

9. That each of said attempted purchases, aggregating said 4,311 shares of said stock, by said American company as aforesaid, in its necessary operation, at the time it was made, tended, and tends, to materially suppress competition, and create in said American company and its said licensee companies a monopoly in the rendering of telephone service to the public throughout the United States and in the different cities and other places thereof, and that

it was the intention and purpose of said American company in making each of said pretended purchases of said shares of stock, to so restrict and suppress competition in said telephone service and create in itself a monopoly in said service.

10. The court further finds that each of said attempted purchases of said shares of stock was contrary to the public policy of the state of Illinois, and void, and that no title to said stock passed thereby from any of said sellers to said American company or said Barton, but that despite said attempted sales each of said sellers still remains the owner of the shares of stock so attempted to be purchased from him.

11. That said Barton, with money furnished by said American company, paid to said defendant DeWolf (as the attorney in fact of said Milo G. Kellogg) for said 3,306 shares of stock, the following amounts on the following dates:

January 17, 1902	$148,770.00
February 1, 1902	66,120.00
March 15, 1902	33,060.00
March 26, 1902	32,526.89
July 8, 1902	33,593.11
May 5, 1903	37,159.44
	$351,229.44

and also paid said DeWolf for said 203 shares of his stock the following amounts on the following dates:

January 17, 1902	$ 9,135.00
February 1, 1902	4,060.00
March 15, 1902	2,030.00
March 26, 1902	1,997.27
July 8, 1902	2,062.73
May 5, 1903	2,281.72
	$21,566.72

and also paid said Katherine W. Wright for said 12 shares of her stock the following amounts on the following dates:

March 18, 1902	$900.00
March 26, 1902	118.06
July 8, 1902	121.94
May 5, 1903	134.86
	$1,274.88

and also paid to said defendant Clarence Buckingham for said 262 shares of his stock the following amounts on the following dates:

January 17, 1902	$ 11,790.00
February 1, 1902	5,240.00
March 1, 1902	2,620.00
March 26, 1902	2,577.76
July 8, 1902	2,662.24
May 5, 1903	2,944.88
	$ 27,834.88

and that said American company paid for said 528 shares so subsequently purchased by it to the owners thereof the following amounts on the following dates:

Adolphus Busch, 215 shares February 21, 1903	$25,800.00
Charles Nagel, 42 shares February 21, 1903	5,040.00
H. J. Hanford, 259 shares February 21, 1903	31,080.00
Scott Hanford, 12 shares February 21, 1903	1.440.00

12. That on the 19th day of December, 1906, said Kellogg company declared a dividend of fifty per cent upon all its capital stock, and said Kellogg company (being then and since January, 1902, under the control of said American company) on that date paid to said American company or to its representatives, and said American company received, a dividend of fifty per cent (being the amount of $215,550) upon the 4,311 shares of the stock of said Kellogg company so attempted to be, and claimed to have been purchased by said American company as aforesaid.

13. That on the 21st day of January, 1907, being the day fixed by the by-law of said Kellogg company for the holding of its annual meeting of stockholders of that year, for the election of directors, the annual meeting of the stockholders of said company duly convened at the office of said company (at which meeting 4,970 shares of stock was present in person and by proxy), that at said meeting Milo G. Kellogg was present in person, and in the election of directors for the ensuing year, tendered his ballot as a stockholder of said company for his said 3,306 shares of stock, and also for 100 other shares of said stock owned by him, said ballot being for—and others of the stockholders representing 331 shares of said stock, tendered their ballots based upon said shares, for—the following persons as directors of said company for the ensuing year:

F. W. Dunbar, Kempster B. Miller, George L. Burlingame, Milo G. Kellogg, Leroy D. Kellogg, James G. Kellogg, and J. B. Edwards; and said Barton and Driver, the representatives of said American company, by proxy also appeared at said meeting and also tendered their ballots for the 4,311 shares of said stock, so claimed to have been purchased by said American company for six other persons as directors of said company, and also for said J. P. Edwards as a seventh director, as did also the owners of 228 other shares, and said defendant DeWolf, who was acting as the chairman of said stockholders' meeting, received said ballots of said representatives of said American company and refused to accept said ballot of said Kellogg for said 3,306 shares, and declared said Wallace L. DeWolf, Clarence Buckingham, J. B. Edwards, F. J. Dommerque, Hopkins J. Hanford, E. H. Brush, and M. Lester Coffeen (for whom said representatives of said American company had voted in their said ballots) elected as the directors of said company for the then ensuing year; whereupon complainant Dunbar, who was also present at said meeting, assumed to act as chairman and declared those voted for by said Kellogg, et al, duly elected as said directors; and the court finds that said Kellogg was entitled to be recognized as a stockholder of said company and to have his ballot counted, and that said representative of said American company were not entitled to be recognized as such stockholders or to have their said ballots counted, and that by reason of said election, said Dunbar, Miller, Burlingame, Milo G. Kellogg, LeRoy D. Kellogg, James G. Kellogg, and said Edwards were thereby duly elected as, and are, the directors of said Kellogg company, until their successors shall, pursuant to the by-laws of said company, be elected, and said six other above named persons are not directors of said company. And that by the charter and by-laws of the Kellogg company, its board of directors consists of seven members, all of whom are required to be elected annually at the annual meetings of stockholders to be held on the third Tuesday in January, and to hold their offices until their successors are duly elected and qualified.

It is therefore ordered, adjudged and decreed: I. That said Milo G. Kellogg, Clarence Buckingham, Wallace L. DeWolf, Mrs. Katherine W. Wright, Adolphus Busch, Charles Nagel, Hopkins J. Hanford, and Scott Hanford, are still severally the owners of the said shares of stock (aggregating 4,311 shares) so attempted to be purchased by said American company as aforesaid, and that Kellogg company, its directors, officers and agents be, and they severally are, hereby permanently enjoined and restrained from rejecting the votes of any of, or refusing to recognize, said named persons, or their assigns severally, as the owners of said shares of stock, except as this injunction is hereinafter modified, and also from recognizing or treating said American company, of any of its assigns, as the owner or owners of, or permitting said American company or any of its assigns to vote, any of said 4,311 shares of stock.

It is further ordered, adjudged and decreed: II. That the temporary injunction issued herein be made permanent, and also that the defendants American Telephone & Telegraph Company, Western Electric Company, Enos M. Barton, and George F. Baker, and all other persons claiming ownership of, or interest in, said 4,311 shares by assignment or transfer, from either of said last named parties (since the institution of this suit), and their agents, officers and attorneys, and each of them be, and they are hereby, perpetually enjoined from claiming ownership of, or any right or interest in, any of the said 4,311 shares of stock so attempted to be purchased by said American company from said defendants Milo G. Kellogg, Clarence Buckingham, Wallace L. DeWolf, Katherine W. Wright, Adolphus Busch, Charles Nagel, Hopkins J. Hanford, and Scott Hanford, or any of them, and also from attempting to vote in person or by proxy any of said shares at any meeting of the stockholders of said Kellogg company, and from claiming by reason of any of said shares to be a stockholder of said Kellogg company, and from attempting to sell or transfer, or vest ownership in others of, any of said 4,311 shares or the certificates representing any of said 4,311 shares of stock; and also from directly or indirectly, except as hereinafter provided, interfering with said Milo G. Kellogg's ownership or control of, or his right at any meeting of stockholders of said Kellogg company to vote, said 3,306 shares of stock belonging to him as aforesaid, or the like ownership or right of said Buckingham as respects the 262 shares of stock belonging to him as aforesaid, or the line ownership, control, or right of said DeWolf respecting the 203 shares of stock belonging to him as aforesaid, or the like ownership, control or right of the defendant Mrs. Katherine W. Wright respecting the twelve shares of stock belonging to her as aforesaid, or the like ownership, control or right of defendant Busch to vote the 215 shares of stock so belonging to him as aforesaid, or the like ownership or control or right of Hopkins J. Hanford respecting the 259 shares of stock so belonging to him as aforesaid, or the like ownership, control, or right of said Nagel respecting the forty-two shares of stock belonging to him as aforesaid, or the like ownership, control or right of the defendant Scott Hanford respecting the twelve shares of stock so belonging to him as aforesaid; but nothing herein shall prevent said Barton or said Baker from hereafter purchasing as an individual and in his own right, or on behalf of others than said American company, said Western Electric Company, their successors, and any of said licensee companies of said American company, any of said shares of stock from any of said present owners or their assigns, or under this decree if the same shall be sold hereunder.

III. And that the defendants DeWolf, Buckingham, Dommerque, and Hopkins J. Hanford, and each of them, be permanently enjoined and restrained from acting as, or claiming to be, or ex-

ercising any of the powers or privileges of, a director of said Kellogg company, and from, as a director or otherwise interfering with, controlling or participating in, the conduct or management of the business affairs or the possession or control of the property, books, or papers of said Kellogg company, unless and until he shall have been hereafter duly elected or appointed such director at some meeting of the stockholders or directors of said company hereafter held, or shall have been hereafter duly appointed as officer or agent of said company, and also from directly or indirectly interfering with, or preventing, complainants Dunbar, Miller, Burlingame, defendants Milo G. Kellogg, LeRoy D. Kellogg, James G. Kellogg, and J. B. Edwards, or any successors as director of either of them, or any officer or agent of said Kellogg company elected or appointed by said last named persons, or any of such successors, or any of them, while either of them is acting as a director or officer or agent of said Kellogg company, or as such is managing the business or property of said company.

IV. *It is further ordered, adjudged and decreed,* that the defendant Wallace L. DeWolf, be perpetually enjoined and restrained from acting as, or claiming to be, the president or other officer or agent of said Kellogg company, and as such officer or agent, or otherwise, from interfering with, controlling, or participating in, the management of the business affairs or litigations of, or the possession and control of any of the property, books, or papers of, said Kellogg company, and from attempting, as president of said company, to call to order or preside over, any adjourned or other meeting of the stockholders or directors of said Kellogg company, and from interfering with the discharge of his duties by any person who may have been heretofore, or may hereafter be, elected, appointed, or designated as, the president or other officer or agent of said company by said Miller, Dunbar, Burlingame, Milo G. Kellogg, LeRoy D. Kellogg, James G. Kellogg, and J. B. Edwards, or any of them, or any of their successors as directors, but nothing herein shall prevent said DeWolf from so acting, if he shall be hereafter lawfully designated or appointed as such officer or agent by said directors or their successors in office, or by said Kellogg company.

V. *It is further ordered, adjudged and decreed,* that the defendant Franz J. Dommerque be perpetually enjoined and restrained from acting as, or claiming to be, the secretary or other officer or agent of said Kellogg company, and as such officer or agent from interfering with, controlling, or participating in, the management of the business or affairs or litigation of, or the possession or control of any of the property, books, or papers of said Kellogg company, and from interfering with the discharge of his duties by any person who may have been heretofore, or may hereafter be, elected, appointed, or designated as the secretary or other officer or agent of said company by said Dunbar, Miller, Burlingame, Milo G. Kellogg, LeRoy D. Kellogg, James G. Kellogg, and J. B. Edwards, or any of them, or their successors as directors, and also from secreting, carrying away, destroying, or mutilating, and from preventing any director or other proper officer of said Kellogg company from having access to, and the control and possession of, all the books, papers, records, and other documents of said Kellogg company; but nothing herein shall prevent said Dommerque from acting as such secretary or other officer or agent, if he shall be hereafter lawfully designated as such officer or agent, by said directors or their successors in office, or by said Kellogg company.

VI. *It is further ordered, adjudged and decreed,* that said American company, Western Electric Company, and Kellogg Switchboard & Supply Company, and each of its officers, agents attorneys and employes, be permanently enjoined and restrained from interfering with or obstructing the said Dunbar, Miller, Burlingame, Milo G. Kellogg, LeRoy D. Kellogg, James G. Kellogg, and J. B. Edwards, and their successors when duly elected, or any of them, or any person heretofore or hereafter designated by said directors or successors, as an officer or agent of said Kellogg company, in his or their management or control, as such directors, officers, or agents, of the business or affairs of said Kellogg company, or his or their possession or control of any of the property, books, or papers of said Kellogg company, and also from hereafter recognizing as an officer or director of said company any other person not designated or appointed by said directors above named or their successors, or by officers of said company designated and appointed by them said directors or successors, and said Kellogg company and each of its agents and officers are hereby required, when duly requested by said directors above named, or any such officer or agent, to surrender, yield, and turn over to them, or the persons designated by him or them, all the property, books, papers and documents, in their possession or control, belonging to said Kellogg company, or in which it has any interest.

VII. *It is further ordered, adjudged and decreed,* that said American Telephone & Telegraph Company, within ten days from the 15th day of February, 1908, deposit with the clerk of this court, duly endorsed in blank, or to the order of the clerk of this court, all the certificates of stock representing or purporting to represent the 4,311 shares of stock so attempted to be purchased by said American company as aforesaid. And if necessary to enable him to make the distribution of said shares as in this decree directed, said clerk is authorized to surrender said certificates to the Kellogg company and receive in lieu thereof other like certificates of stock aggregating 4,311 shares.

VIII. *It is further ordered, adjudged and decreed,* that within twenty days after said certificates shall have been deposited with said clerk as aforesaid, and any of said sellers to the American company of said stock shall have been served with notice of the deposit of said certificates with said clerk within five days after such deposit with said clerk, (service of such notice upon the attorneys of such of said sellers as have appeared in this suit being sufficient) such seller may deposit with such clerk a certified cheque upon a Chicago bank in good standing, payable to the order of the American Telephone & Telegraph Company for the difference between the purchase price paid by said American company as aforesaid for said stock, plus the interest at the rate of five per cent per annum thereon from the time or times when said payment or payments were made to the date of said deposit of such cheque, *and* the sum of fifty per cent of the par value of said stock, plus interest thereon at five per cent per annum from December 19, 1906, to the date of the deposit of said cheque, and upon the delivery of said certified cheque to said clerk, said clerk shall forthwith deliver to said seller so depositing such cheque a certificate, duly endorsed in blank, or to said seller's order, for the number of shares so attempted to be sold by said seller to said American company, and shall deliver said cheque to said American company, the names of said sellers and the number of shares to be by said clerk returned to them respectively, are as follows: Milo G. Kellogg, 3,306 shares; Wallace L. DeWolf, 203 shares; Katherine W. Wright, 12 shares; Clarence Buckingham, 262 shares; Adolphus Busch, 215 shares; Charles Nagel, 42 shares; H. J. Hanford, 259 shares; Scott Hanford, 12 shares.

IX. *It is further ordered, adjudged and decreed,* that in the event that said American company shall not in compliance with this decree deposit said certificates for 4,311 shares of stock within ten (10) days from the 15th day of February, 1908, the said certificates of stock for said 4,311 shares and each of them, be, and the same are hereby, canceled and held for naught, and said Kellogg Switchboard & Supply Company is directed to immediately issue and deliver to the clerk of this court eight new certificates for said 4,311 shares of stock, such certificates to be for the several numbers of shares of stock as will permit the distribution in this decree contemplated; and thereupon each of said sellers to said American company may, as, and within the time, provided in paragraph VIII of this decree, deposit with said clerk a certified cheque as, and for the amount, provided in said paragraph VIII, and upon his doing so, said clerk shall forthwith deliver to such seller such new certificate of stock for the number of shares specified opposite his name in said paragraph VIII, and said Kellogg company shall have and recover from said American company the sum of $215,550, and interest thereon at the rate of five per cent per annum from December 19, 1907, crediting, however, in reduction of said judgment all sums received by said American company in respect of dividends or interest thereon which any seller shall have applied by way of off-set in a settlement for his stock under the provisions of this decree, and in default of payment thereof, have execution therefor. Any amount of money so collected by said Kellogg company to be held by it subject to the further order of this court, and any cheques delivered to said clerk by any seller under the provisions of this paragraph, shall be by him turned over and paid to said American company.

X. *It is further ordered, adjudged and decreed,* that if any of said sellers shall not, within twenty days from the time that said certificates shall have been by said American company so delivered to said clerk, and in default of the delivery of said certificates by said American company, then within twenty days after said new certificates shall have been issued by said Kellogg company and delivered to said clerk, as provided in paragraph IX, and notice of such delivery shall have been given to him as aforesaid, deliver to said clerk his certified cheque as above directed, then Thomas Taylor, Jr., as master in chancery of this court, is ordered and directed without any delay to cause said shares of stock of any such sellers so defaulting, to be sold at public auction at the judicial sales rooms of the Chicago Real Estate Board, No. 57 Dearborn street, in the city of Chicago, after having first advertised said sale of stock once a week for three successive weeks, in at least one newspaper of general circulation published in the city of Chicago; and after first paying therefrom the cost of said sale (including his master's commissions for making said sale) said master shall, from the proceeds of such sale, pay to said American company the difference between the purchase price paid by said American company to said seller to it for the shares of stock so sold by the master, plus interest at five per cent, per annum on its said payment or payments of purchase money, from the dates when the same were made, to the day of said sale by said master, and the sum of fifty per cent of the par value of said stock so sold, plus interest thereon at the rate of five per cent per annum from December 19, 1906, to the date of said sale by said master, and if there shall be a balance of said proceeds of said sale after the making of these payments, the master is directed to pay said balance to the seller to said American company of the stock so sold by said master. And said sale or sales of said stock shall

be made by said master for cash, or at the option of any purchaser, one-half of said purchase price cash and the balance thereof payable in six months from the date of said sale, such deferred payments to be evidenced by a note of each such purchaser, and be secured by a deposit with said master of the certificates of the stock so sold and said master is directed, immediately after said sale, to report the same to the court, and upon the confirmation of said report, and the full payment of said purchase price, the said clerk is directed to deliver to the purchaser or purchasers of said stock at said master's sale the certificate or certificates in his hands representing the stock so sold.

XI. *It is further ordered* that, if said American company shall deposit with the clerk of this court, on or before the 25th day of February, 1908, said certificates for said 4,311 shares of stock, the annual meeting of the stockholders of the Kellogg company for the year 1908 (which was adjourned pursuant to the order of this court to February 27, 1908, at 10 o'clock a. m.) be further adjourned until the 18th day of March, 1908, at 10 o'clock a. m., unless before February 27th, 1908, said Milo G. Kellogg and all the other sellers of said stock shall have delivered to said clerk their checks for all said 4,311 shares of stock so to be deposited by the American company with said clerk, and if, before said 18th day of March, 1908, said Kellogg and all the other sellers of said stock shall not have so delivered to the clerk their checks for said stock, said meeting of stockholders shall, upon said 18th day of March, 1908, be further adjourned until the 20th day of May, 1908, at 10 o'clock a. m.

It is further ordered, adjudged and decreed, that the foregoing injunctions ordered by this decree be and are hereby stayed to the extent only as follows: That said Dunbar and the six other persons who were elected directors of said Kellogg company on January 21st, 1907, shall not in any way interfere with or take the management or control of said Kellogg company, its affairs or business, until all said sellers of said stock shall have paid to the clerk of this court the difference between the purchase price of said stock and interest thereon, and fifty per cent of its par value and interest thereon as provided by paragraph VIII and IX of this decree, or in default thereof, until a sale of said stock shall have been perfected as provided by paragraph X of this decree and that from the date of the entry of this decree until one of said results shall have been accomplished as provided by one of said paragraphs VIII, IX or X, the ordinary and usual business and affairs of said Kellogg company shall be conducted, controlled and managed by the present acting directors and officers of said Kellogg company, without any interference or obstruction of any kind, directly or indirectly, by said Dunbar and his associate directors, but said acting directors and officers shall not during such conduct, control or management of the business of said Kellogg company, take any action out of the usual and ordinary course of business of said Kellogg company as transacted by it for the past two years without the further order and direction of this court, and in case of an appeal being perfected from this decree, by any of the defendants, this stay of said injunctions shall at once end.

And it is further ordered, adjudged and decreed, that said acting directors and officers of said Kellogg company shall at once, on the perfection of an appeal from this decree, (or upon the accomplishment of either of the results as provided by said paragraphs VIII, IX or X, as to said stock) turn over and deliver to said Dunbar and his associate directors, and to their successors, when duly elected, all the assets, property, books and papers of said Kellogg company.

It is further adjudged and decreed, that a writ or writs of injunction do issue forthwith against the said defendants commanding them and each of them to comply with all and singular the premises so enjoined upon them.

It is further ordered, that nothing in this decree shall be construed as impairing the validity or effect of any act heretofore done, or contract heretofore made, in the conduct of the business of said company, by the several boards of acting directors of the Kellogg company which have since January 4, 1902, been selected from time to time as a result of the attempted voting by said American company of said 4,311 shares of stock, or of an act heretofore done or contract heretofore made in the conduct of the business of said company, by any acting officer or agent appointed by said several boards.

It is further ordered, adjudged and decreed, that the American Telephone & Telegraph Company pay the fees of said clerk and master and expenses of said sales, and that the complainants also recover of and from said American Telephone & Telegraph Company their costs in this suit, to be taxed by the clerk, and in default of payment of either sum within ten days after the confirmation of said master's report of sale, or in case there is no sale, on or before March 31st, 1908, that execution issue therefor, pursuant to the practice of this court.

And it being suggested to the court that after the decision of this cause and on the 2nd of February, 1908, the defendant Emerson H. Brush departed this life.

It is ordered, adjudged and decreed, that this decree be entered *nunc pro tunc* as of February 1st, 1908, being the day on which the decision thereof was rendered.

The decision in the Kellogg Switchboard & Supply Company case rendered by Judge Windes and on which the foregoing decree was based is as follows:

The bill in this case was filed on the 5th of June, 1903, by certain minority stockholders of the Kellogg Switchboard and Supply Company, representing about 370 shares of the stock of the par value of $100, against the American Telephone and Telegraph Company, a New York corporation, the Western Electric Company, and the Kellogg Switchboard and Supply Company, the latter two being Illinois corporations; also certain officers of these defendent corporations, and the remaining stockholders, as I understand it, of the Kellogg Switchboard and Supply Company that are not complainants in the case. The court will refer to these three corporations as the American company, the Western company and the Kellogg company, respectively, so as to save a few words.

Stating the case generally the principal purpose of the bill was to have declared void and set aside a sale of certain stock of the Kellogg company by several of its stockholders to a defendant, Mr. Barton, the stock being taken in the names of the defendants, Barton and Baker, but taken for the American company, as I believe is conceded. Certain other specific relief is asked by the bill beside the setting aside of the contract, and it also asks for general relief. After the filing of divers demurrers on the part of different defendants, and answers to the original bill, the filing of an amended bill, a supplemental bill and a cross bill by the defendant, Milo G. Kellogg, and of demurrers and answers and amendments to these answers by different defendants, to the amended and supplemental bill, and the cross bill, respectively, the demurrers were sustained, and the several bills dismissed for want of equity by decrees entered by Judge Mack some three years and a half ago. These decrees were sustained on appeal to the branch appellate court, but on further appeal the decree dismissing the amended and supplemental bills was reversed by the supreme court, though the court in its opinion says the demurrer is sustained to the original bill, and the cause was remanded with directions to proceed in conformity to the views of the supreme court. The decree dismissing the cross bill was affirmed by the supreme court. Since that decision of the supreme court the issues were made up on the amended and supplemental bills in conformity to the supreme court decisions, and after the hearing had commenced in the case a further supplemental bill was filed, on which issues were made during the progress of the hearing. To state the details or even the substance of all these pleadings would take unnecessary time, and it would be needless in view of the conclusions that the court has reached. I will endeavor to make it as condensed as I can.

The evidence, which took some four weeks to hear, among other things which the court deems unnecessary to be stated, shows that the Kellogg company was organized in 1897, and ever since has been operated as a manufacturing corporation, manufacturing telephone switchboards and telephone apparatus in Chicago. It has been a very successful and prosperous corporation up to the latter part of 1901, when its president and the active manager of the corporation, the defendant Milo G. Kellogg, who was the owner of a large majority of its stock—as I remember about 3,300 shares of the total of 5,000 shares of the capital stock—was compelled on account of very extreme ill health in the latter part of November, 1901, to leave all business and go to California for an indefinite time, the prospect then being, as is quite clearly shown by the evidence, I think that he might not be able to resume active business again for a long period, if at all. Mr. Kellogg, on leaving for California, left practically all his private business matters and property in charge of and under the management of the defendant, Wallace L. DeWolf, who is his brother in law; and Mr. DeWolf, who was also a stockholder and vice-president of the Kellogg company, then took the active management of that company on the 16th of November, 1901, in place of Mr. Kellogg. Mr. Kellogg was an expert of very long experience in the business of manufacturing telephones and telephone apparatus and in their installation, and was also a patent expert in the same line. Mr. DeWolf was a lawyer by profession and had for quite a number of years prior to this date, and including 1901, been engaged in the real estate business in Chicago, though he was without any practical experience as a manufacturer of or in the installation of telephones or telephone apparatus, nor does it appear that he had any experience with patents.

The Kellogg company, though its business had been quite prosperous, had up to this time paid no dividends, and the management tentatively had arranged a short time prior to Mr. Kellogg's leaving for an increase of its capital stock and the sale of the same to different stockholders, and I believe some others—I am not sure about that—in order to meet the necessities of the company's then contemplated expansions in its business, as well as its financial difficulties, by reason of the apprehended failure of one of its principal customers, referred to in the evidence and arguments of counsel as the Everett-Moore syndicate, that syndicate being then indebted to the Kellogg company about $275,000, which was largely in the form of short-time notes that had been discounted at different banks by the Kellogg company, to the amount of about $220,000.

Soon after Mr. Kellogg left for California this syndicate failed to meet certain of its discounted notes as they matured, and they

had to be paid by the Kellogg company. The question then as to the failure of the syndicate at once became very important to the Kellogg company, and Mr. DeWolf, after a suggestion to him of the sale of Mr. Kellogg's stock in the Kellogg company, and the suggestion of the name of the defendant, Enos M. Barton, as a possible purchaser of that stock, by Leroy D. Kellogg, a son of Milo Kellogg, and after discussing the situation with him—I refer to Leroy D. Kellogg, who was then, too, the secretary and treasurer of the Kellogg company—commenced negotiations with Mr. Barton for the sale of the stock of his father, in order to raise money to meet the financial situation of the Kellogg company. These negotiations commenced—it is not definitely fixed when, but I think the preponderance of the evidence is that they commenced at least early in the month of December, 1901, and extended through the remainder of that month and up to January 4, 1902.

Mr. Barton was then the president and had the active management of the defendant, the Western company, which was a competitor in business of the Kellogg company, located in Chicago, and engaged in the manufacture of electrical apparatus and supplies, telephones, telephone apparatus, and their installation, but mainly for the American company and its licensees or lessee companies. The relations of the American company and the lessee companies will be more definitely referred to later. It also was then operating a large manufacturing plant in New York, engaged in a similar line of business. The American company at this time owned and still owns more than 60 per cent of the capital stock of the Western company, and also a majority of the stock of numerous local telephone corporations in different parts of the United States, as well as a minority of the stock in many other like telephone corporations throughout the United States, all of which local telephone corporations had licenses from the American company, and are known throughout this case, in the evidence especially, as licensee or lessee companies. These last named companies constituted a part of the system of telephone business of the American company practically, which extends throughout this whole country and is referred to in the evidence and the pleadings, in connection with the American company and the Western company, as the "Bell system," the "Bell interests," and the "Bell telephone monopoly," though it is quite clear that it is not a complete monopoly.

The American Company at this time had an authorized capital stock of $150,000,000, and had outstanding stock issued to a very large number of stockholders, to the amount of near $120,000,000. Its authorized capital during the year 1907 was increased to $250,000,000, and it had stock actually issued during last year to the amount of about $150,000,000.

The American company is, and has been ever since its organization, engaged in what is known as long distance telephone service throughout the United States, and in connection with its lessee companies, as well as other telephone companies, in no way connected with it, and with the exception of the business done by what are referred to in the pleadings and in the evidence as the Independent telephone companies or system, does all the long distance telephone business in the United States; and it is also referred to in the evidence of its president, the defendant Frederick T. Fish, as a stock holding corporation, evidently because of the large amount of stock that it owns in its licensee companies above referred to.

I think it clearly appears from the preponderance of the evidence that the American company has a practical monopoly of the telephone business in a very large part of the United States, and its competition with other corporations known as the Independent telephone companies engaged in that business in many parts of the United States, was at the time of the sale of the stock in question, and for several years before that sale, quite a strenuous competition, and in some instances the witnesses put it as a "bitter" competition. There was such competition between the Bell interests and the Independent companies at this time, in the court's opinion, it being established by a preponderance of the evidence, as I have stated, and it is practically admitted by some of the defendants' witnesses, Mr. Dommerque, Mr. DeWolf and Mr. Barton; and the competition is also shown by the evidence of the president of the American company, Mr. Fish, who was called as a witness on behalf of the plaintiffs.

During the whole existence, up to January 4, 1902, of the Kellogg company, it was the principal manufacturer in the United States of telephones, telephone switchboards and telephone apparatus and supplies for these Independent companies. The next largest manufacturer in that line in the United States was a corporation known as the Stromberg-Carlson Telephone Manufacturing Company, and which will be referred to hereafter as the Stromberg-Carlson company. Another leading manufacturing corporation in that line, in January, 1902, was the American Electric Telephone Company. These three last named corporations were the only ones then manufacturing multiple switchboards for Independent companies in the United States, which up to January, 1902, was the principal part of the business of the Kellogg company. The Western company at this time was largely engaged in manufacturing for the American company and its licensee companies. In January, 1902, there were about four thousand telephone operating companies in the United States, and organized in many of the states into state associations, and there was also a national association, which included about that number, and they were in no way connected with the Bell interests except their lines in some instances operated together, and these Independent companies purchased their supplies largely from the Kellogg company and the other two Independent manufacturing corporations above referred to. They, including the manufacturing companies, represented an investment in 1902 of about $150,000,000. In 1907 the number of these Independent telephone companies had increased to about seven thousand in the United States, and about that number was included in the national association of the Independent companies. But what their investment was in 1907 does not appear from the evidence, so far as the court can discover. Divisions 2 to 11, both inclusive, of the complainants' amended bill show far more specifically in detail by their allegations the nature and extent of the business of the Kellogg company, the Western company, the American company and its lessees, and the Indepednent telephone companies, their relations to each other and the public, and the nature of the competition between the American company or the Bell system and the Independent telephone companies, including the Kellogg company up to January, 1902. All of these allegations referred to are, in the opinion of the court, substantially proven by the evidence.

The Everett-Moore syndicate and the Kellogg company, through Mr. DeWolf and its attorney, during December, 1901, had considerable negotiations in regard to the payment of the syndicate indebtedness to the Kellogg company, and efforts to make arrangements by which the Kellogg company's financial condition on account of this indebtedness would be relieved; but nothing was accomplished by these negotiations. And on January 2, 1902, the failure of this syndicate was publicly announced in the press, and the attorney of the Kellogg company, who was down east at the time, where these negotiations were progressing, and who then had charge of them on the part of that company, about that date—I don't remember specifically the day on which the notice was given—notified Mr. DeWolf in substance that no arrangements as to the indebtedness of the syndicate to the Kellogg company could be made. Then and not until then the negotiations between Mr. DeWolf and Mr. Barton, and Mr. Fish through Mr. Barton, culminated, and resulted in the contract for the sale of the stock in question to Mr. Barton. This contract, omitting the attached statement referred to in it, is as follows—I will not take the time to read that, that is entirely familiar to counsel, and I will only refer to certain parts of it.

The evidence shows that the purchase of said stock to the amount of about 4,311 shares was made by Mr. Barton for the American company, acting through Mr. Barton and its president, the defendant Fish, and was paid for by the funds of the American company. The principal question presented is: Was the transaction illegal and void as being ultra vires, or against the public policy of Illinois?

The case was remanded by the supreme court with directions to proceed in conformity with the views expressed by that court, and therefore those views are res adjudicata on the law, and binding on this court, in so far as applicable to the evidence in this case. The court says in its opinion, 224 Ill. at p. 22: If the American company became the purchaser of said stock, with the unlawful purpose and intention of putting the Kellogg company out of business, or so using and controlling it as to prevent rivalry in business and creating a monopoly, it called for an answer from the defendants. Also, if the American company had purchased a majority of the capital stock of the Kellogg company in its own name for the purpose of controlling the latter, and thereby preventing competition between itself and the latter corporation, the transaction would have been one which the courts of this state would not uphold. Citing 130 Ill. 258, the gas trust case, and other cases.

And the court also further held that the purchase by the American company in the name of another would make the transaction illegal. Also, in commenting on whether the tendency of the purchase would be to suppress competition, it says: "While a complete monopoly or a complete restraint of competition would not necessarily result, the tendency would be in that direction, which is sufficient to condemn the transaction as unlawful." Citing the gas trust case above referred to and More v. Bennett, 140 Ill. 69, known as the Reporters' case. And in reference to the averments of the bill that it was the purpose of the American company to suppress competition and create a monopoly, it says: "It is aided by the averments as to how Barton was to pay for the stock, and that the business of the Kellogg company was to be carried on in the usual manner for one year." And further says that "these averments plainly indicate that a dissolution of the Kellogg company was contemplated, because in no other event could the American company appropriate the assets of the Kellogg company to pay a stockholder of that company for the stock purchased by the former company from it." And says that the court had reached the conclusion—I quote the exact language—"that the purpose and tendency of the purchase by the American company are sufficiently shown by the bill to be to suppress competition by that company in telephone service to the public and create in the American company a monopoly of that business."

Further, in speaking of the American company being a foreign

corporation, the court held that it is subject to all the rules and regulations provided by the laws of this state, citing a number of cases, and the twenty-sixth section of the corporation act, which so far as material here is as follows: "Foreign corporations and the officers and agents thereof doing business in this state shall be subjected to all the liabilities, restrictions and duties that are or may be imposed upon corporations of like character organized under the general laws of this state, and shall have no other or greater powers." The court, speaking of the power of the American company to purchase a majority of the stock of the Kellogg company for the purpose of controlling it, held that it could not do it, and said—this is the direct language of the court—"to permit it to do so would be against the law of this state and its public policy."

It makes no difference now that the evidence shows that the American company also purchased stock of another corporation, since under the Illinois statute and the supreme court decisions, an Illinois corporation cannot purchase stock under the circumstances attending this purchase. And that, the court is of opinion, is fairly established by the gas trust case and others following since that, especially the glucose case in the 182d Ill., I think the decision is reported in.

The language of the supreme court, by the use of the words "purpose and tendency" conjunctively, in several instances which the court has referred to and in others not referred to, when speaking of a question as to whether the purchase of the stock would have the effect of suppressing competition or creating a monopoly, would seem to indicate that "purpose" in that regard on the part of the purchaser should be shown in order to make the contract illegal. This court is, however, of opinion that such was not intended to be the ruling of the supreme court, for it, in effect says, on page 23 of the opinion, that "tendency to create a monopoly or restrain competition is sufficient to condemn the transaction as unlawful." And that is the holding of the supreme court in the gas trust case, More v. Bennett, Harding v. the American Glucose Company, 182, Ill. 551, at pages 617 to 620, and the cases there cited. This court considers this ruling as res adjudicata as to the law of the case. And if it can be said that the contract, considering the circumstances under which it was made, had a tendency to suppress competition or create a monopoly, it is void as against public policy. The allegations of the bill the court has referred to, regarding the circumstances under which the contract was made, being substantially proven, it follows that the supreme court's ruling must control in the decision of this case on this point.

The fact that the purchase gave the American company the absolute control of the Kellogg company, enabled it to prevent the selling of supplies by the Kellogg company to Independent telephone companies, to stop the business of the Kellogg company, or even to dissolve the Kellogg company, shows a natural and reasonable tendency to suppress competition and create a monopoly; though it is but just to the defendants in this connection to say that the Kellogg company did not cause its sale of supplies to the Independent companies, nor did it stop its business, and it has not been dissolved, but it has paid a dividend since this sale, upon its stock, of 50 per cent. The court thinks there was a very wise and prudent conduct and management of the business of the Kellogg company to avoid any evidence, so far as it possibly could, which would tend to establish the tendency of such a contract.

If the court, however, is wrong as to the scope of the supreme court decision in this regard, and that it is necessary that there should be shown purpose on the part of the purchaser of this stock, in order to make the contract illegal—that is, a purpose to suppress competition or create a monopoly—the court is of opinion that the preponderance of the evidence shows such purpose on the part of the American company. To review this evidence would require very much time, and it seems sufficient to make reference to the proof in a general way. The fact that there was a serious competition between the American company, its lessee companies, and the Western company, known as the Bell system, on the one part, and the Independent telephone companies, of which the Kellogg company was one of the principal Independent manufacturing companies in the United States, on the other part, when the nature and extent of the business of all these companies, as alleged in divisions 2 and 11, inclusive of the amended bill, and which have been substantially proven as heretofore stated by the court, are considered in connection with the terms of the contract of purchase, and the circumstances shown by the evidence as existing during the negotiations leading up to the purchase, especially the seriously involved financial condition of the Kellogg company, and Milo G. Kellogg, his past activity in the Independent telephone movement for more than five years prior thereto, his opposition generally to the Bell system in his business and in the business of the Kellogg company, the strong probability that this activity would not commence again for a long period, if at all, because of his bad state of health; that Mr. DeWolf was to be in charge of the Kellogg company and had very friendly business relations with Mr. Barton and the Western company; that the Everett-Moore syndicate, which was also on the verge of failure and largely indebted to the Kellogg company, was a large Independent telephone organization, which, if successful in its line of business, would prove a strong competitor to the Bell interests, all of which matters are clearly established by the evidence, there seems to have been ample reason for saying there was a purpose on the part of the American company to place itself in a position, by this purchase, to suppress competition and build up a monopoly.

Also in addition to these matters the court should not ignore the well recognized fact throughout the business world that, with rare exceptions, the leading characters to which the court will omit names, who control large corporations or business interests, are on the lookout continually by some means, whether direct or indirect, to absorb or overcome their competitors in trade. When this natural tendency of human nature is considered with all the other matters referred to, the conclusion as to purpose seems to the court a reasonable one, to use a mild term, notwithstanding the evidence as to the intention of the purchase by Mr. Barton and Mr. Fish to the contrary, and also notwithstanding the very exhaustive and able arguments of defendants' counsel.

Very soon after January, 1902, more than a year before the purchase was known to the public, of the making of the cotnract of purchase of the stock, the evidence shows that there was an effort by Mr. DeWolf and Mr. Barton to buy out the Stromberg-Carlson company, the next largest Independent manufacturing company of telephone apparatus to the Kellogg company, or, to put it more mildly, negotiations to purchase were started during the month of January, 1902, or about that time, though nothing was accomplished. That is a strong item of evidence, in the court's opinion, tending to show a general purpose to suppress competition and get control of the then largest Independent telephone manufacturing companies for the purpose of promoting a monopoly. Considerable evidence was also presented to the court of like efforts on the part of the American company to make similar purchases as late as 1907, but the court regards it as quite remote in point of time, questions the competency of this evidence, and has therefore not considered it in reaching its conclusion on the matter of purpose of the American company in making the purchase of the stock in question.

The court is of opinion that the contract, therefore, is void as against public policy of the state of Illinois, because the preponderance of the evidence shows a purpose to suppress competition and create a monopoly in the line of business of the Bell system, though not a complete monopoly. And this purpose is in addition to the tendency of the contract to the same effect as has been stated by the court. In view of these conclusions, it seems to the court unnecessary to discuss the question of whether the contract was ultra vires, though that would seem, under the evidence and the rulings of the supreme court, under our statute—section 26 of the corporation act which has been quoted—to be settled in the affirmative.

A great mass of evidence was offered and admitted, subject to objection by the court, both on behalf of the complainants and the defendants, regarding the manner in which the business of the Kellogg company has been conducted since the purchase by the American company of its stock, the extent of that business, its profits, the increase and decrease of certain parts of its business; as to certain patent suits between the Kellogg company and its customers on the one part and the Bell interests on the other part, both before and after the purchase of the stock; as to the foreign business done by the Kellogg company both before and after the purchase, within the past two years mainly; also the purchase by leading employes of the Kellogg company of the Western company's stock, the Kellogg company loaning them more than $57,000 in order to enable the employes to make their purchases; and negotiations between Mr. DeWolf and one Judge Thomas in regard to the Kellogg company entering into a combination with certain Independent telephone companies, all of which it is claimed has a bearing on the question of purpose and intention of the American company in making the purchase of the Kellogg company's stock. The court had some doubt as to the competency of all this evidence, because a great deal of it was with regard to matters quite remote from the transaction in question and not necessarily having any bearing upon it. It may be that many of the things shown were done because of purposes or intentions formed after the purchase of the stock in question; and, if so, they would have no bearing on the transaction. And for that reason—namely: that it was not necessary to the result reached by the court as to the tendency of the purchase to consider purpose and intention—the court has not considered the items of evidence last above referred to, as should have been done, and the court thought that the decision of the case depended wholly upon the purpose or intention of the American company in making the purchase. It is contended by defendants' counsel that the amended bill contains no allegation as to tendency, and therefore that no relief can be granted under the pleadings. This contention, in the court's view, is not tenable, for the reason that, as has been stated, facts are alleged which the court is of opinion clearly show the tendency of the purchase, and it was so decided by the supreme court.

It was contended by defendants' counsel that the allegations of the amended bill, in effect, charge the commission of a crime on the part of the defendants, and therefore that the allegations of the bill must be proven beyond all reasonable doubt, before any relief could be based thereon. It is unnecessary to pass upon this point, for the reason that the court's ruling is as to the tendency and pur-

pose of the purchase, and that does not amount to a crime, but only shows that the transaction is void as against public policy.

The court on the hearing took notes of the evidence and arguments of counsel, in an abbreviated form, which if written out would make about 125 typewritten pages, all of which it has carefully considered since the arguments closed, and it has also read such parts of the pleadings and evidence as were necessary to refresh its recollection. Reference has not been made to any points of the arguments of counsel, nor to the details of the evidence, but all have been carefully considered, and the conclusions reached thereafter. The court makes this statement to assure counsel that the importance of the case has been appreciated, and nothing presented has failed to receive the consideration of the court by reason of carelessness or willful negligence.

The transaction in question being void, if the court is right in its ruling in that regard, it follows that no title to the stock passed, and Milo G. Kellogg and the other sellers of stock under the Barton contract are still the owners of the stock under the law. The decision of the supreme court controls as to Milo G. Kellogg's rights to any relief under the cross bill, it being based upon alleged fraud, and there was no offer in the cross bill to place the purchaser in statu quo. It is true, the court says, "the contract is not void, but only voidable at the election of the defrauded party." But this must be construed with reference to the relief asked in the cross bill being based upon alleged fraud, and has no bearing on the complainants' rights under the amended bill, which depend upon the situation as to them. The supreme court holds, on page 26 of the opinion, that the invalidity of the purchase is sufficient to entitle complainants, as minority stockholders, to have the American company restrained from voting the stock purchased by it, and thus controlling the Kellogg company. This right of complainants exists, notwithstanding the adjudication of the supreme court on the cross bill, based on its allegations of fraud in bringing about the purchase. If the transaction between the American company and Milo G. Kellogg and other sellers of the stock is void, as held, the complainants are entitled to relief that should be granted on the basis of their equities, although the result may indirectly be a benefit to Milo G. Kellogg and other sellers of stock and an injury to the American company. Complainants' relief should not be limited on this account, but should be granted on such conditions as will cause the least injury to the parties concerned in the transaction and at the same time give them their equitable rights. To protect the complainants and do equity to them, they are entitled to have restored, so far as possible, the situation as it was before the purchase of the stock, and in so far as a change has resulted from that sale. This can be accomplished by requiring the American company to bring the stock in question into court, together with all dividends paid thereon, with interest at 5 per cent per annum from the time of payments respectively of such dividends, and the return of the stock to Milo G. Kellogg and to others that sold to the American company under the Barton contract, upon their paying to the American company the prices paid them for this stock, with interest at 5 per cent per annum from the times when said payments, respectively, were made to them. In case the sellers, or either of them, should fail to make return of the purchase prices of stock with interest as stated, within thirty days from the entry of the decree, then the decree should provide that the stock be sold under the direction of the court, say one-half cash and balance in six months from sale, with interest at 5 per cent per annum, such balance to be secured by a deposit of the stock with the clerk of this court as security. Pending the making of such payments the business of the Kellogg company should be conducted by the present administration of that company, or its president should act as a receiver of the court, of course giving large and ample bond, which I think in this case should not be less than $100,000; and the annual meeting of the stockholders should be adjourned under the terms of the decree of the court until said payments are made, or, in default thereof, until a sale of said stock shall be made and perfected, as indicated.

In case of failure of any seller of the stock to pay the purchase price of his stock to the American company within thirty days from the entry of the decree, then the proceeds of the sale of that specific stock should be paid to the American company to the extent of the purchase price paid by it for such stock, and interest at 5 per cent per annum from the dates at which the American company paid such seller for such stock. If there should be any surplus on the sale of the stock over said price paid by the American company and interest, it should be paid to the seller of said stock—I refer by the seller, to the American company, under the Barton contract—said dividends and interest thereon, as if paid into the court, should be paid over to the seller of said stock, after deducting therefrom any deficit from the purchase price of said stock, as paid by the American company, and interest thereon, which may result from the sale of the stock, under the order of the court.

The court is inclined to the view that the facts alleged in the amended and supplemental bill, and as has been stated were proven, and the fact that the bill has a prayer for general relief, would justify a decree as indicated, except as to the receiver, which is suggested, not because there seems to be an absolute necessity for one, but to avoid, so far as possible, any friction that may arise, pending a closing up of the decree, or pending an appeal, which may be taken from this court, as has already been suggested by counsel on both sides. If the complainants desire a receiver, the court is of opinion there should be an amendment to the pleadings, and perhaps additional proof even, which would be justified because of the injunction which has already been granted temporarily, and the apparent financial responsibility of the parties in control of the Kellogg company, and especially in view of the financial success of that company since it has been under their control.

One part of my notes I failed to give, and that is this: The American company and its representatives should by the decree, and pending its accomplishment, be enjoined from in any manner interfering with the management or conduct of the business of the Kellogg company, and the temporary injunction, granted February 13, 1907, should be made final, except as in some of its provisions it may conflict with the decree here indicated by the court.

If a decree is to be entered on the pleadings, as they now are, it may be drafted, declaring the sale of the stock void, as against the public policy of this state, and setting it aside; and also in accord with the court's rulings, as has been indicated, omitting the receiver. If counsel for defendants, they having declined in the oral agreement to discuss any decree, except one denying complainants any relief, are of opinion that the decree directed by the court is not proper, under the court's rulings, and in view of the evidence and the pleadings, the court will consider anything they desire to say on that subject at the criminal court next Tuesday morning at 8:45. If counsel cannot be present to present their views, if they desire to present any on that point, why, then they can prepare a brief in three days, on the question of the form of the decree only.

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MR. ROBBINS (attorney for the complainants): If the court please, there is no disposition on the part of the complainants to disturb the condition of things until the money is paid, and until the decree is entered, but I would like your honor to hear me upon the suggestion that if Mr. Kellogg, the large stockholder, pays his money, as suggested by the court's decision, and takes back his stock, and the parties do then appeal, that the appointment of a receiver after the decree, and upon appeal, which I think the court has ample power to make, should result in the naming of Mr. Kellogg as the receiver during the appeal, and not Mr. DeWolf, because Mr. Kellogg then will have all his money in it, and be the party most interested in the management of the company. I say that because that might affect Mr. Kellogg and his counsel in the question of paying the money. And then I think that it would put the corporation, during the appeal, in a position where the tendency to create a monopoly or perpetuate the present monopoly or tendency to monopoly, would be obviated during the appeal. I make the suggestion, asking your honor to reserve your judgment as to who should be the receiver during the appeal, until we can see how the parties will stand after reading your honor's decision. Mr. Kellogg, through his counsel, will come in and pay up the money, and I make the suggestion, your honor, and I think the situation ought to be considered a little differently.

THE COURT: What I have said with regard to the receiver is simply a suggestion of the court.

MR. HOLT (for the defense): I apprehend that we shall have something to say that your honor would want to consider pretty carefully as to the propriety, in the case suggested by Mr. Robbins, of putting Mr. Kellogg in a position to wreck the company pending the appeal, and leave nothing for us to get back in case our appeal should be successful. That, however, like the rest of it, is a matter that will be considered when the time comes. I should think the whole discussion of this subject is premature.

MR. ROBBINS: I agree with counsel. I suggest that we get up the decree along the lines that we think it should be entered, and then it may be the parties will conclude not to appeal, or if they do conclude to appeal the court will be able to see more clearly what will be the relation of the parties in regard to the property while the appeal is pending, and the personality of the receiver can then be more properly considered, if a receiver is to be appointed.

THE COURT: I want to say to counsel that inasmuch as the form of the decree was in no way discussed, on the theory that it would be for the complainants here, I am ready to listen to defendants' counsel as to the form of the decree.

MR. HOLT: It occurs to me, if the court please, without conference with my associates, because I have just come in from the train after your honor began to read your decision, it occurs to me that the best way of saving time will be for complainants' counsel to draft such a decree as they would advise, and submit it to us, and with something concrete and definite before us we can argue to your honor a good deal more intelligently on it, with a good deal of saving of time, and it may not be necessary to argue it at all. So if your honor will cancel the engagement on Tuesday morning——

MR. ROBBINS: I think that will be better.

THE COURT: I don't want to delay.

MR. HOLT: We are as anxious as any one to get it disposed of and want to get it out of the way during the month of February, because I think both Mr. Robbins and I are planning for other engagements during March, but we will get at it, and we will ascertain your honor's engagements and see what will come up.

MR. ROBBINS: I think that is a very good suggestion on the part of Mr. Holt, and I will comply with it.

THE COURT: Very well.

WHAT INDEPENDENT TELEPHONY HAS DONE FOR KANSAS CITY

BY C.D. WRIGHT

THE experience of every city that has been subjected to the arbitrary methods peculiar to the Bell monopoly proves, beyond question, that exclusive control of the telephone industry by that corporation is a detriment to any locality.

For years, agents of the American Telephone and Telegraph Company labored to impress upon the minds of the people throughout the United States the doctrine of "natural monopoly," declaring that two telephone systems in one town would be not only inconvenient but exceedingly expensive. The confusion likely to result from the existence of rival plants was dwelt upon with great perseverance, and it was asserted that business men, in order to make themselves accessible, would be under the necessity of patronizing both companies, thereby paying almost double the rates charged by the Bell trust. Strenuous efforts were made to convince the public that the reduction of profits following the establishment of more than one exchange in a community would render proper maintenance and extensions impossible—that service would deteriorate.

Kansas City Home Exchange.

Many of those who were suffering from the evil consequences of abuse of power by high-handed managers sincerely believed that competition would only increase their troubles. Trust-ridden cities—probably more through the corruption of officials than through deference to the wishes of telephone users—persistently refused admission to Independent companies, and the Bell people, although compelled to use enormous sums of money in the way of tribute, retained the supremacy.

To the middle west belongs the honor of first becoming thoroughly awake to the fallacy of the arguments used for the protection of greed and intolerance. With Indiana in the lead, state after state was revolutionized by the Independent movement. While New York, Boston, Cincinnati and other places within the dark circle were paying the penalty of allegiance to the Bell company, a large number of cities and villages farther west enjoyed the advantages derived from competition.

Previous to the organization of the Home Telephone Company, Kansas City was compelled to submit to all the annoyances and losses that usually follow in the wake of the octopus, which, in accordance with its custom at non-competitive points, enforced, without exception, the rule of small expenditures and large assessments. Old equipment, suitable only for wreckage, was made to do duty. It was proved in court during a controversy between the corporation and the municipality, that the switchboards in use were composed of scraps or half-worn materials patched together with small regard to effi-

ciency. Bell dictators ignored the complaints of the people and adhered to grounded circuits and second-hand box transmitters of antiquated pattern long after metallic circuits and modern instruments had been introduced elsewhere by Independent companies. The salaries paid to employes were so low that it was difficult to obtain competent electricians and operators; poor service was the inevitable result. Exasperating delays and discourteous responses from "central" occasioned constant friction. Excessive charges in both residence and business districts added to the indignation of citizens.

No sooner had the Home company entered the field than the benefits of competition became apparent. The Bell people tore out old lines and substituted metallic circuits; new switchboards and up-to-date instruments were introduced; the voice of "central" became wonderfully sweet and she acquired a promptitude and patience that seemed remarkable in view of past irritability. Extensions were made that, under former conditions, would not have been considered. Even the farmer in the Missouri bottoms began to realize that the greatest convenience of modern times was within reach and established means of telephonic communication with his neighbors and the city—something unheard of during the days of Bell control. Local financiers of small towns in western Missouri and eastern Kansas, encouraged by the success of the Independents in the metropolis, organized home telephone companies, installing plants of superior quality. The impetus given to trade in general by extensive building in surrounding territory was of inestimable value to Kansas City from a commercial standpoint. New electric companies made their appearance; and telephone supply houses with headquarters in other portions of the country opened branch establishments in the Missouri city. Large orders for materials began to come in from various places in Kansas, Oklahoma and Texas. Employment in different lines was furnished to working people; greater demand for labor brought higher wages. All classes shared to a certain extent in the wave of prosperity. A 50 per cent reduction of rates and good service rendered by the new corporation increased the total number of subscribers from 8,000 (Bell) to 40,000 (Home and Bell), and there is no longer a telephone famine in Kansas City. As for the "expense" theory, it proved to be simply a bug-bear, as the Bell company adopted nickel-in-the-slot machines which are used for incoming calls at no cost to business men, who employ the Home telephone at a reasonable flat price for out-going messages.

There is a growing appreciation of the benefits of competition in the Missouri Valley. The results of the advent of Independent telephony are: Progress in matters of construction; the use of new inventions; the betterment of the condition of wage-earners; official recognition of the rights of the public; and general improvement of the entire telephone situation in Kansas City and vicinity.

EXPERIMENTAL POLE TREATMENT

From the Journal of the Worcester Polytechnic Institute

By Walter R. Wheaton

AT the present time the United States is facing the same problem which the European countries were called upon to face years ago,—the constant diminution in the supply of timber. The two greatest consumers of our timber resources, the railroads and the power and telephone and telegraph companies using poles for transmission-lines, are wondering where their future timber supply is to come from. The decrease in the supply means increase in the cost of the product, and with a constant increase in the demand the prices are constantly rising. On the Pacific coast in the last two years the cost of a 40-foot transmission pole has almost doubled.

There are three solutions to the problem, or, at least, three ways whereby the evil day may be put off; (1) by using some substitute for the wooden poles and ties now in use; (2) by treating all poles and ties used in the future with some preservative which will add to the life of the wood, and consequently increase the available supply; and (3) by the use of inferior woods, whose use is made possible only by the use of a preservative. The first method has been and is being tried. Steel and concrete have been used both here and abroad, but with little success. A thorough treatise on the use of metal ties may be found in Bulletin No. 9 of the Bureau of Forestry, written by E. E. R. Tratman. Poles of reinforced concrete are in use to some extent abroad and steel and iron poles are being used here. The Edison Electric Company, of Los Angeles, Cal., is using two types of steel poles. On its main line from the power house in the Kern River country to the distribution station in Los Angeles, a distance of 167 miles, and over which line it is transmitting 40,000 horse-power, steel towers set on a concrete base are in use. The wires are carried on porcelain insulators two feet high, set in iron pins. This is probably the finest transmission line in the country. On the Edison company's high-tension distribution lines, steel poles, built in a tripod shape with the legs spread about a foot at the base, are in use. The poles are made of three and three-quarter round steel, latticed and set in concrete. The cost of such a pole fitted with one six-pin cross-arm, delivered in Los Angeles, is $30.

The Forest Service of the Department of Agriculture is doing all in its power to diminish the demand and to increase the supply of timber as much as possible by the creation of national forests, by forest planting, by inducing the use of forestry methods on lands to be lumbered, and by co-operating with the various consumers in an endeavor to find some economical method of preserving the product against decay. The pole presents a different problem from the tie. The tie is in contact with the ground and subject to decay for its whole length, and consequently the whole tie is treated. This is accomplished by running the ties into a large cylinder, the doors of which are hermetically sealed. The sap and moisture are then steamed out of the wood and the preservative solution forced into the tie under pressure. A pole usually rots from two feet below the ground to one foot above. The expense of treating a 35-foot to 40-foot line for its whole length to insure it against decay for only three feet of its length would be too great. Consequently a pole is treated only from the butt up to one foot above the ground line, or for seven or eight feet of its length. Owing to the unsymmetrical formation of a pole it is almost impossible to use pressure on the butt only. A pressure apparatus was constructed by the Forest Service for use in the experiments now being carried on in southern California, and although it was

found possible to get a pressure of sixty pounds to the square inch before a leak was discovered, the cost of the treatment was found to be too great in view of the penetration which could be obtained without pressure.

There have been three methods used by the Forest Service in its experimental treatment of poles—the brush method, the butt-plate method, and the open-tank method. The former consists in painting the preservative compound on with a brush. The oil is usually applied hot. This method gives the pole a thin coating of oil, the penetration being not more than an eighth of an inch, and usually less. The oil usually used in treatments of this kind is a carbolineum made from the distillation of naphthalene. It has a specific gravity of about 1.2, and is a very heavy, high boiling oil. The objections to the use of this method are as follows: The penetration is very slight, which necessitates very careful handling of the pole after treatment; if a cant hook is jammed into the treated section of the pole, the point of the hook will penetrate below the oil and thus leave an opening for the fungus to take root. All of the checks must be filled, for if the checks are not filled, or if the pole checks after setting, the effect of the treatment is lost, since there is an available foothold for the rot-producing fungi.

The butt-plate method was designed for forcing the oil into the pole under pressure. A plate (a little less in diameter than the diameter of the pole) having a raised knife edge was placed against the butt of the pole so that the knife edge entered the wood and formed a chamber for the oil between the butt of the pole and the face of the plate. Three dogs were driven into the side of the pole and held the plate firmly against the butt. The oil was pumped through a one-inch pipe screwed into the back of the plate. When the pressure was applied it was found that the oil squirted out through the season checks in the wood, making it impossible to force the oil into the pole. Another objection to this is the fact that there is an outer layer of wood left with no oil in it and it is very essential that this outer layer be penetrated. This method was abandoned by the Forest Service as not giving the desired results.

The process used with the most success by the forest service is what is known as the open-tank process. This is an application of the old Seeley process. The wood is given a bath of hot oil followed by a bath of cold oil. The poles are submerged in hot creosote oil for a depth of one foot above the ground line, and are allowed to remain in the hot oil for from five to eight hours. They are then either placed in another tank containing cold oil or are allowed to remain in the same oil as it cools. When the timber is placed in the hot oil, the moisture remaining in the wood is evaporated and the air in the wood cells is expanded. When the poles are changed from the hot to the cold oil or the oil is allowed to cool, the difference in the temperature induces a vacuum which causes the oil to penetrate the wood. The poles should always be thoroughly seasoned before treatment.

Very few poles have been set long enough to show the efficiency of the various treatments and preservatives. Four years ago the Pacific Light and Power Company of Los Angeles, Cal., set a line of poles from San Bernardino east to the power house at Mentone. Two hundred and one of these poles were treated, 43 with carbolineum, 151 with asphaltum and cement, the pole being first wrapped with burlap and then dipped in the compound, and 25 with asphaltum and cement with no burlap wrapping. The object of wrapping the pole with burlap is to make the asphaltum and cement stick to the wood. Cement is added to make the asphaltum flexible and adhesive. Recently 138 of these poles were examined, the earth being removed from around the pole for a depth of one foot. The treatments showed results as follows: Of the 43 poles treated with carbolineum, 27 were examined and found to be rotted through the sap wood in nearly every case; 87 of the poles treated with asphaltum and cement, with the burlap wrapping, were examined and seemingly all were sound. The asphaltum and cement and the burlap forms a hard shell on the outside of the pole. On 25 of these poles the burlap was cut and the wood underneath examined. Of the 25 poles, 14 were sound and the remaining 11 were rotted through the sap wood. Of the 25 poles treated with asphaltum and cement without the burlap, 21 were badly rotted. The poles examined were cedars from Washington. These poles show a sap wood of one-half inch to one and one-half inches in thickness. This sap wood will rot in from two to three years, but the heart will stand for from eight to twelve years. A recent publication of the German government gives the life of treated and untreated poles as follows. The figures are taken from statistics on 3,000,000 poles:

Treated with.	Life.
Sulphate of copper	11.7 years
Corrosive sublimate	13.7 "
Creosote	20.6 "
Untreated	7.7 "

There is no question as to the efficiency of a treatment with creosote. If a sufficient penetration can be obtained the increase in the life of the pole is assured. The Forest Service has found the open-tank process to be the best as yet tried for the treatments of poles. To obtain the best results the oil should penetrate to a depth greater than the pole will check. A treatment with a brush will retard the rot for a time, but the treatment is not an efficient one. Creosote has shown its efficiency since the days of the Egyptian mummy, but is recognized to-day as the best preservative known. By the use of creosote inferior woods which otherwise could not be used have been placed upon the market and have thus saved the supply of better woods for trades for which they are absolutely essential. In the south and the east creosote has made possible the use of loblolly pine for poles and ties, and in the west a penetration of two inches at the six foot mark of a 40-foot pole of yellow pine has been obtained. This will give this pole a life of at least fifteen years as against a life of three years untreated.

TRIAL BY TELEPHONE.

THE LATEST court trial by telephone is reported from Decker, Indiana, where Oscar Driverhead, engineer, of a ferryboat at Mt. Carmel, Ill., was fined $25 and costs for assault and battery on a passenger. The prosecuting witness lived in Decker, Knox county, and the affidavit was filed before Squire Charles Gleen, of Decker township. Driverhead was arrested in Mt. Carmel, after which he was brought across the river to the Indiana side and the trial was by telephone, with the justice ten miles away, while the prosecution was conducted by Marion Glenn, assistant prosecutor, from his office in Vincennes, twenty miles away. Several witnesses testified by telephone. Because of his conduct on the boat Driverhead's license as a steamboat engineer has been revoked by the government inspectors.

IMPROVEMENTS AT FAIRBURY.

FOLLOWING the sale of additional stock, the Fairbury Telephone Company, of Fairbury, Neb., intends to make extensive improvements in its plant and extend its rural party lines. A two-story brick building 106x25 feet will be erected on Fourth street, the second floor to be used for the operating room and manager's office. New equipment will be secured, including a multiple magneto switchboard, costing altogether upwards of $10,000. The same amount will be spent in extending rural party lines.

THE INDEPENDENCE OF INDEPENDENTS

An Address made before the International Telephone Convention, Chicago, January 22.

By W. H. Denlinger, Patton, Pa.

IT IS difficult to speak on this subject without necessarily saying something that has already been said, and it is altogether likely that I shall to-day unintentionally touch upon subjects which will be referred to by others. If I do, I beg your pardon in advance.

In an immortal document which has been honored and revered by the people of this country for a century and a quarter, and which has been quoted from by all the nations of the world, we find the following:

"We hold these truths to be self-evident, that all men are created equal, and that they are endowed by their creator with certain inalienable rights."

This was the first American Declaration of Independence. This immortal document stimulated in the minds of our forefathers the idea that they were justified in severing their allegiance to the power which had arbitrarily controlled them for many years. This spirit of independence has so permeated all conditions of men, that notwithstanding the fact that a century and a quarter has elapsed since it was written, the American people still assert their independence.

When the Independent telephone movement was first started, "our friends, the enemy," not only belittled the movement and predicted failure but were arrogant enough to deny that we had a right to go into the telephone business. They claimed that inasmuch as they were first in the field, and had spent large sums of money to develop a business which the necessities of the country demanded, the business world owed it to them as a right that they should be protected, and that a moral wrong was being done in encouraging the use of Independent telephones to their financial detriment. But the old spirit of independence was too strong to yield to this kind of sophistry, and the general public welcomed the Independent telephone movement all over this country to such an extent that to-dav the Bell Telephone Company realizes, as never before, that Independent telephone companies are a factor that must be counted upon.

Having declared our independence, it is necessary that we should maintain that position. Our forefathers not only presented their declaration of independence to the world, but showed their faith in the movement by maintaining its principles at all hazards. In order that an Independent telephone company shall be independent and preserve its individuality, it must carefully avoid even the appearance of association or co-operation with the Bell company.

The fact that the equipment of the opposition organization is being offered to you to-day at prices and under conditions that would not have been two or three years ago, is a temptation to which no Independent telephone company should yield. Be independent enough to say no.

At a recent meeting held in Pennsylvania by the state association, a resolution was passed pledging the Independents of that organization not to purchase any Bell equipment, and that any member of that organization doing so subjects himself to expulsion. Several other state associations adopted like resolutions, and we trust the same will be done by the International association at this meeting. Let us here assert that we are Independent in all that the term implies, and the only way that independence can be preserved is by avoiding even the appearance of co-operation or association with the Bell company.

It is not to be supposed that the late action of our great opponent is for the purpose of helping or benefiting the Independent telephone companies. You can depend upon it, "There is an African in the wood pile" somewhere; you may not be able to see him, but he is there just the same.

We must not allow our spirit of independence to carry us to a point where we do not recognize that we are dependent upon others for support and success. We are dependent upon the public for patronage and for financial support. These are essential to success. Our subscribers have a right to exact from us the best service possible. They also have a right to equitable rates and a fair return for money paid. We fear that too many Independent companies make the mistake of building up a business at low and unprofitable rates, and then subject themselves to severe criticism when it becomes necessary to advance those rates or restrict the free radius territory. The necessity for a change in rates restrict the free radius territory. The necessity for a change in rates may be apparent to your board of directors and stockholders, but it is not, as a rule, apparent to the general public. After we have once secured the business of a community, we are likely to subject ourselves to a charge of being as great a monopoly as the old company. This mistake is common among the great majority of companies organized prior to recent years. Let the new ones profit by this experience, and avoid the same mistake. The public are dependent upon us for good service, the best obtainable. Better ten times over to serve 5,000 subscribers satisfactorily than to serve 20,000 subscribers unsatisfactorily. Do not preach the doctrine of independence to your subscribers and expect that to answer their criticisms on your service. The sentiment of the country in general is in favor of the Independent telephone companies, but do not depend upon sentiment in business. The fallacy of an Independent telephone company relying upon sentiment in a community for support is a very dangerous one. There is no lasting magical effect so far as the public is concerned in the word "Independent." It is simply a cold-blooded business proposition, and you must so meet it and so consider it. If you rely upon public sentiment without giving one hundred cents worth of service for every dollar paid, you will most certainly fail. Your only legitimate reason for asking or expecting the support of the public is fair treatment. Any other principle or idea predominating your organization means, in the end, loss of public support, and as a consequence, failure, and the failure of one Independent telephone company is heralded broadcast throughout the land by the Bell company, and used as an argument over and over again as a reason why the public should not invest in your securities, or encourage your development.

One recognized distinction between corporations that are known as Independent in any branch of business and so-called monopolies is the fact that the general public are interested financially in the organization. This idea should not be lost sight of among Independent telephone companies, but encouraged to the greatest possible extent by encouraging local investors. Five men owning stock in an Independent company in a small community will do you

more good than 500 stockholders in Chicago, Pittsburg, Philadelphia, New York or Boston.

We wish to emphasize forcibly the idea of local stock interests. It is not necessary to dwell upon the advantage to you of this condition as I feel justified in saying that every man within sound of my voice has personally experienced its benefit. I fear the tendency to consolidation of Independent companies is to some considerable extent robbing us of the benefit of local support. This is to be regretted, and how to prevent it is a very serious problem and one worthy of careful consideration.

One suggestion I have to make to counteract this effect is closer personal supervision by the officers of the company so far as the demands and criticism of the public are concerned. See that the officers and principal employes form a close personal relation to your subscriber. Do not feel that your manager is idling his time when he drops into the store of a subscriber and has a friendly chat for a few minutes. See that the officers of your organization become personally acquainted with as many of your subscribers as possible; or, in other words, do not allow your subscribers to feel that there is no one particularly interested in seeing whether they get good service or not. Make each subscriber feel that his interest is being *specially* looked after. When a complaint is received from a subscriber or a request made, no matter how trifling, if it is at all possible let the subscriber be interviewed personally by someone representing the company. Do not write him telling him his complaint will have attention.

Allow me to cite a case coming under my own personal observation a few years ago. A large user of Bell telephone company service wanted some changes made in his contract, revision of rates, etc. He wrote to the headquarters of the company four or five times and received an unsatisfactory reply by letter, the substance of which was that the matter would be looked into and he would be advised later. Two years passed and nothing was done. An Independent telephone company was organized in the community, and he was asked to subscribe to the service, which request he at once complied with and turned over all the business he possibly could to the new company, immediately notifying the Bell company to remove all instruments he could possibly dispense with. This action resulted in a visit from one of the officers of the company who was promptly told that he waited two years for an interview with someone who felt a little interest in his telephone service, and that while he was very glad to be honored with a call, it was too late, as he had already closed contracts with the Independent company.

Human nature is very much alike the world over—every man likes to be recognized. It makes him feel good to have someone pat him on the back and tell him he is a good fellow. It is a good thing to do and does not cost any money. Try it in the telephone business; it will pay.

Proclaim to the world that you are an Independent telephone company and advertise that independence by a liberal use of the shield.

I am well aware of the fact that there are many companies that do not approve of the emblem adopted by this association. This is true in Pennsylvania and in other states. Do not allow your spirit of independence to carry you to that point where you are not willing to recognize that the will of the majority should prevail. The shield is of itself a suggestion of independence. Every telephone company in the United States should adopt this emblem. Put it upon your envelopes, upon your stationery and at the entrance to your exchanges. Use it everywhere you can. Let the subscriber to the Independent companies in Ohio know that to all intents and purposes so far as business interests are concerned it is the same telephone company that is doing business in Philadelphia, Pittsburg, St. Louis, Indianapolis, New Orleans, Buffalo and Chicago.

The man or corporation who is entitled to the reputation of being independent should be, and generally is, fearless to some considerable extent. Independent telephone companies should not lose sight of the fact that there is no occasion for being afraid of competition. Show your independence by invading the strongholds of the Bell company without fear. Better twice over to spend your time, money and energy in a field where the opposition has developed the telephone habit. Every manager who understands his business will tell you that he can do more business and get more subscribers at less expense where the Bell company is strong and have educated the people to the use of a telephone than in heretofore unoccupied territory. This has been our experience in central Pennsylvania, and I venture to say that it has been the experience of all here to-day. Our largest subscription list now is where the Bell company was formerly strongest. Our smallest list of subscribers is in communities where they had no previous telephone service. Do not fear competition. I know of no business to-day that thrives so wonderfully under the spirit of active competition as the telephone business.

While I assert that you do not need to fear competition, I wish to emphasize the fact that when the opposition get actively at work in your community it is very necessary for you to get busy. My experience has been that many managers take life very easy as long as there is no apparent necessity for being active, but let a corps of Bell solicitors come into that manager's field and the chances are, if he understands his business, he will get particularly active. He will brush up his service, check up his missed calls, visit his subscribers, get very solicitous concerning the kind of service they are receiving, and in fact, give every subscriber all the personal attention possible. In so doing he improves his service, increases his subscription list and materially adds to his toll receipts. This is one of the good effects of competition.

After you have succeeded in establishing a successful Independent telephone system, do not allow your spirit of independence to grow to such an extent that it will be necessary for you to have your hatter re-block your hat and to make it larger.

Do not become too independent of the public. Never lose sight of the fact that you represent a public service corporation, and as such the rights of the public should receive your every consideration.

Be independent enough to resist the demand of your stockholders for dividends on your stock until you have earned them, and have them in cash in your bank. I would not minimize the necessity of putting a value upon your stock at the earliest possible date, but better, ten times better, never to pay a dividend on your stock if in so doing you sacrifice your capital or the actual necessities of your maintenance department.

Be independent enough to be satisfied with the territory for which you have money enough to develop without enlarging your territorial limits beyond your financial capacity to develop. More telephone companies have impaired their credit and sacrificed their dividends on their stock by yielding to this spirit of acquisition than from any other one cause. Develop your territory as you go. If new lines are to be built and new territory developed get new money for that purpose.

Do not depend upon original investment to take care of future developments. Your original stockholders have a right to demand dividends on their stock. The investing public are always ready and willing to buy dividend paying stocks, but hesitate to buy dividend earning stocks if the earnings are kept in the treasury to use for additional development.

This will do for a while, but your stockholders soon get tired of being told that their earnings are being put into the property. They very much prefer handling the earn-

ings. You may succeed in satisfying your stockholders for a while by pursuing this policy and by submitting frequent statements showing the wonderful progress you are making, but the time will come when they will either demand a change in management or sell their stock.

Do not allow your spirit of independence to grow to such an extent that you feel you can afford to be independent of the press. What you may term a fourth-class newspaper in a second-class town can do you more damage in one or two issues than you can repair by a dozen solicitors in a month. Keep on the good side of the local newspaper editor. Give him a little advertising, let him do some of your printing. see that his telephone service is always good, give him to understand that you recognize him as an independent man running an independent newspaper and that you want the support of that independent newspaper for your Independent telephone company. I care not how unreliable the editor may be as a man, his paper is read by nearly everybody in the community and can be made a strong factor in creating public sentiment for or against you.

I would not encourage the idea of a free telephone with a newspaper publisher, as it looks too much like purchasing his support. Gain that support legitimately, and then retain it by fair treatment and honest business methods. Pay him for what he does for you and require him to pay for what you give him. By so doing you both maintain your independence.

Be independent enough of the custom and experiences of the past by studying the new conditions as they develop. Do not fail to recognize that business conditions change. Read the telephone publications of the day carefully, and keep yourself fully and thoroughly advised as to the financial condition of the country. Do not become committed to the idea that because someone has succeeded in the past in a certain policy that is the only way to succeed; do not get it into your mind that because someone failed by pursuing a certain policy some other plan could not produce better results.

Let me call your attention at this time to the condition that exists in the business world to-day. Independent telephone companies will, during the next two or three years, at least, be compelled to show their independence of the so-called "financial genius." You will be compelled to depend entirely upon the actual worth and merit of your enterprise rather than upon the skill of a promoter.

During the past few years, the business world has been startled by the wonderful success of many schemes promoted by well-known men who have figured prominently in the financial world. Many of these enterprises have had but little real merit,, but the magical effect of certain names in its directorate, and the name of some financial genius at its head as president was enough to interest the investing public. Millions of dollars have been invested by our people in bonds and stocks of corporations with nothing to commend them but a catchy prospectus and the names of certain men as promoters who were well known in the financial world. I need not name any conspicuous examples; you, no doubt, are familiar with many.

The revelation of the past year and the sad experience of the past few months relegates this plan of promotion to the rear for a while at least. The investing public of to-day will not be satisfied with names of men at the head of their organization as a guarantee of its success. You must know the actual results.

Do not depend too much upon future prospects. You must have men at the head of your organization who have the confidence of the investing public as successful business men—men who are known workers, men who have made their reputation by hard work and not as financial promoters of great schemes. Keep at the head of your company practical, level-headed, stead-going, conservative business men, and the investing public will be more interested in your industries than every before.

I predict that during the next two or three years a legitimate, prosperous and successful business enterprise will not suffer for the want of capital, but the new, untried, speculative, large stock bonus, get something for nothing schemes, which have been so successful in the past, will fail.

In conclusion, let me add: Do not become so independent as not to fully recognize the importance of close cooperation with your employes. There is no business in the country to-day that is so dependent upon its employes as the telephone business, and I know of no corporation that can boast of more loyal support upon the part of their employes than the Independent telephone companies of today. Recognize their value and do not be afraid to let them know that you appreciate their services. The little girl sitting at your switchboard, to whom you pay the munificent salary of from $15 to $30 per month can ruin any telephone company. You may have the finest equipment that money and skill can produce; you may have a toll line that is a marvel of completeness and perfection; you may have an organization backed by millions of capital; you may have, in short, a complete and perfect telephone system, yet the little girl above referred to can, in one hour's time, cause more trouble and do you more injury than a twenty-four-hour sleet storm. Your linemen can spend $5 in repairs where $1 is necessary, and it is almost impossible to detect the loss. Your construction superintendent can add $50 per mile to cost of your pole lines and you will not know it until the work is done. Your manager can make your subscribers friends or enemies.

The entire success of the operating department of your business is dependant upon a few loyal and, I am sorry to say, generally underpaid employes. *Do not forget the boys and girls behind the guns.*

"CHILDREN CRY FOR IT."

A BUSY Lawrencian recently added a telephone to the modern improvements at his home, says the Lawrence (Mass.) Tribune. He has four happy children, all of them young, to whom the telephone was new and who regarded it with awe. One of the kids is a boy of four. He watched the older people call up "Central" and communicate with friends at distant points and yearned to do likewise.

His mother chanced to be absent from home for an hour or so on a recent afternoon. The other children were out somewhere. He was alone. For a half hour he watched the telephone, then climbed up and took the receiver of the telephone off the hook just as he had seen older people do. By this time he was trembling, but his courage was as strong as chilled steel.

"Number?" he heard a sweet voice inquire. For a moment he was startled, but he conquered a desire to drop the received and run and shouted bravely, "I want my pop!"

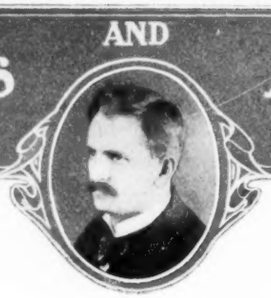
"Central" must have recognized the voice as that of a child. She promptly inquired, "Who is your papa?"

The little fellow knew enough to tell her, and it was but a matter of a few moments to ascertain the number of the busy Lawrencian's business telephone and connect the four-year-old.

"Hello?" answered the busy citizen, turning away from a desk overburdened with papers and things.

"Oh, pop, I kin work it!" was the joyful little shout that answered him, and the busy citizen was just as proud and as pleased as the four-year-old at the other end of the line when the brief conversation ceased and the boy, obeying instructions given over the wire, hung up the receiver and awaited the home-coming of mamma to tell her of his conquest.

Questions AND Answers By H. P. Clausen



AFTER a series of tests made in our shops, and after much discussion, I present to your valued paper the following problem: Take thirty feet of copper wire and connect to it the ringer of a 1600 ohm. standard telephone. Place another instrument of the same kind upon the circuit and the resistance from wire to wire is decreased. Upon placing still another instrument of the same make in connection with the wires, the resistance still decreases. Each ringer measured 1600 ohms. and was of a standard make. What effect would this test have on a No. 12-B-B iron line from five to eight miles in length? Can you account for the resistance decreasing on the short length of thirty feet of copper wire? F. P. B., Indiana.

When you connect a 1,600-ohm ringer to the terminals of a Wheatstone bridge and measure the resistance, the result will be the resistance of the ringer plus the resistance of the testing wires, whether this testing wire be thirty feet or thirty miles in length. The total resistance shown by the bridge will be that of the ringer and the wires connected in series. Now, if you will install an additional ringer measuring say 1,600 ohms resistance, connecting it at the same point where the first ringer was attached, then the resistance shown by the bridge will be the resistance of the line wires plus the combined and parallel resistance of the two ringers, and if you should connect the third ringer to the line wires, at the same point, you will have one-third the resistance of 1,600 ohms plus the line resistance. Thus you will observe that while the line resistance remains constant; the resistance of the different ringers connected in parallel is being reduced as you add the ringers in multiple. You will easily understand this feature when you take for granted that the line wire may be completely short circuited at the point where the ringers are connected with the result that you obtain the exact line resistance and you can only reduce this line resistance as measured by short circuiting the line wires at a point closer to the testing bridge. It is not quite understood what you mean by inquiring as to the probable effects of such operations on a No. 12 B-B iron wire eight miles in length. The only difference between the last named condition and the first stated proposition is that the line resistance will be different, while the parallel resistance of the ringers will remain the same.

I have understood that a vacuum presents a very high resistance to static as well as to ordinary electric currents. Will you kindly inform me if this is true? I enclose a circular from a company selling a special lightning arrester. The claims of this company are of such a character that I would like to have more information upon the subject. J. B. R., Minnesota.

If it were possible to produce a perfect vacuum, it would at the same time produce a perfect insulator, for no electric current will flow across a space unless the space is occupied by a gas of some kind. The circular which you enclose explains that the operation of the arrester depends upon the partial exhaustion of the chamber containing the carbon electrodes, and therefore indicates that the manufacturers understand that when a perfect vacuum is produced the arrester becomes inoperative. Ordinary currents will not pass across the gap owing to the exceedingly high resistance. Of course, when the voltage is increased to a sufficient degree, a flow of current would take place.

Having a horse shoe magnet, such as is used in a telephone generator, how can I remagnetize it? It has lost some of its magnetization, and I would like to know the best way for remagnetizing the steel bar. W. J. W., Iowa.

Unless you have special provisions for doing so, we suggest that you send it to some telephone manufacturer and let him magnetize the steel for you. It will be very difficult—at any rate very expensive—to make up a magnetizing magnet. If you have a dynamo and remove the armature from it and energize the field magnets of the dynamo, then by placing the magnet poles in contact with your steel magnet you may obtain a fairly strong article. But, as suggested, it will be very much cheaper for you to send it to a manufacturer of telephone apparatus who will re-magnetize the steel for you at practically no expense.

If you could soon publish an article on the "Essentials of Voice Transmission" relating to the work and duty of the transmitter, I believe it would be timely and of general interest, for an up-to-date, scientific and practical discussion of that most important part of the telephone certainly would result in bringing out points of great interest. M. C. T., Texas.

We always endeavor to secure articles which our readers are desirous of reading, but while waiting for something to be published upon this subject, it is suggested that you carefully study TELEPHONY'S digest of current literature and you will certainly find something of interest. Most papers can be secured by writing direct to the publishers in accordance with notation which you will find at the head of the digest.

We are having considerable induction on our lines from the electric companies' arc circuits. They have three circuits and we get it from all of them on different lines. I will give you one circuit: They use 65 volt 6.4 amperes enclosed arcs, alternating current. There are forty-two lamps on this circuit and they are fed from a tub which regulates the voltage. The arc circuits enter the town and one leg taking in these forty-two lamps makes a complete circle of a portion of the town and comes back to where both the wires enter the town. The arc circuit is free from tree grounds and I have cleared two telephone lines for an example, so they don't touch a twig and don't show a sign of ground on the volt meter. These lines come in the circle of the arc wire and are still noisy. Now I believe if both sides of the arc circuit, that is, the two wires, were carried around the distributing route together, it would stop this induction, but that would be very expensive and I am not sure enough of it to urge such a step. Now can you tell me positively if the trouble can be stopped by using the two wires, and if there is any other cheaper way to clear the lines? M. T., Pennsylvania.

While you do not state, it is assumed that you are operating a common return system, although it may be possible that your circuits are metallic and that you are operating some form of a party line system, in which the line wires are grounded. It would be necessary to know the circuits of your switchboard system, as well as the party line system in order to answer your inquiry in an absolutely intelligent manner. There is no question, however, but that most

of your inductive troubles would disappear if the arc circuit were made metallic and the lamps distributed in each limb of the metallic circuit in an equalized manner; that is, it would not result in as great a benefit from an inductionless standpoint if the arc lamps were simply placed in one limb of the circuit and the remaining limb carried back directly even though it paralleled the main circuit. The lamps should be equally divided upon the two limbs in order to produce the best results. However, the best thing for you to do is to give us complete information as to the circuits of the system you are operating, condition of the party line connections and a sketch showing in general the location of the arc circuits, your telephone exchange and the point to which your telephone lines are in a general way distributed. If any of our readers can offer suggestions to the correspondent, the editor will be pleased to publish them in the April TELEPHONY.

I would like to know if there are any underwriter's rules for telephone, telegraph and electric light wiring, and how I can obtain a copy. J. S. V., Kansas.

If you will write to the National Board of Fire Underwriters, Chicago, they will undoubtedly give you information as to the best method for securing the information desired.

We use the divided circuit ringing system on our party lines. All lines are metallic talking and ringers are of course connected from both line wires to earth so as to permit signaling either one or two subscribers without interference. Our toll line is metallic and practically free from grounded connections. By means of transpositions we eliminate practically all cross talk, but when toll lines are connected to any party line on any exchange and an operator rings out over a party line parallel to the toll line-cross ringing is had to such an extent as to prevent a satisfactory conversation to be held during the period that the signaling current is being projected over the party line. Any position on a ten-pin cross arm is sufficiently noisy to stop conversation. Is there any remedy? O. J. S., Colorado.

The difficulties which you complain of are, of course, due to the inductive effect between the grounded party lines; that is when you ring out over one of the party lines you project ringing current over the line through the bell to earth, and when any of these lines are of considerable length a noise is induced upon an adjacent wire whether these wires belong to a toll line or whether they belong to another party line. During such periods that the toll line is not connected with the party line, transpositions on the toll line take care of the toll line and when the toll line is connected to a party line directly through a switchboard then your inductive disturbances from the party line are effective both upon the toll line and the party line connected to it. Not knowing the exact conditions of your circuits, it is thought that your immediate remedy will consist in connecting together party line and toll lines through repeating coils. This, of course, will call for installing repeating coils in your switchboard cord circuits and it would cost but a few dollars to make a trial upon one of your cord circuits in order to observe the difference in the noise produced while connecting toll and party lines together through repeating coils and connecting them together without repeating coils.

Kindly inform me how to compute the location of a single transposition which will eliminate the disturbances upon a metallic circuit telephone line paralleling a 2200 volt electric light lead for a distance of about one thousand feet. If this can be done, please advise. Can you give me the name of some book or publication which treats upon transposition of telephone wires in detail? R. F. H., Connecticut.

It is safe to state that you cannot locate a single transposition in your line circuit and clear the telephone line from induction. If the remaining portion of your telephone circuit extends beyond the points you indicate in your diagram, then it would depend somewhat upon the location of the transpositions as to whether a single transposition upon the one thousand feet length can be made to clear the inductive noises. We should say that you should have at least four transpositions in the one thousand feet length in order to clear any inductive disturbances, for the lines appear to be on an average sixty feet apart. We presume that the electric light circuit is metallic, although you do not state that it is. Therefore, as stated above, make about four transpositions equally divided into the one thousand feet length and if your insulation between the electric light and telephone circuits is good, then you should be able to clear the inductive disturbances. It is assumed, of course, that you have no grounded connections of any kind forming a part of the metallic telephone circuit. Regarding a book upon transpositions, there was a paper read by a Mr. Towle, before the Association of Railway Superintendents. By writing the secretary, Mr. Drew, Harvester Building, Chicago, you will undoubtedly be able to secure a copy. It is suggested that you watch the columns of TELEPHONY for articles bearing upon problems similar to yours.

THE IMPORTANCE OF AN EFFICIENT GROUND CONNECTION.

We have twenty farm telephone lines, ground return, two metallic toll lines, and about fifty-four local lines for city service, each having from one to five telephones connected to the line, and all city lines are of the ground return type. There is a great deal of cross talk, especially on the farmers' lines, which comes through about 500 feet of paper cable, one wire only to each line. We have about fifty lines altogether, each running through this cable. The ground is about seventy-five feet from the switchboard. It is three-eighth inch iron pump rod driven six or eight feet into the earth. This rod is connected to the switchboard by means of a No. 14 copper wire. Should the ground connection be made upon the pipes of the water supply system? What size wire should we use? B. J., Iowa.

From the nature of your inquiry, you desire to eliminate some of the cross talk by changing the ground wire. We beg to suggest that one of the first things you should do is to connect the return terminal in your switchboard to the iron pipes of the water supply system by means of a copper wire no smaller than No. 8 B. & S. gauge. Be sure that solid connections are made between the wire and pipes. Now as regards your toll service, this probably comes into the board through the paper cable. If your paper cable is of the twisted pair type, and perfectly dry, then you should not have any cross talk from the toll service on to the grounded lines. As to running your grounded lines through the paper cable, if the cable is of the twisted pair type, connect your line wire to one of the pair, then connect the remaining mate of the pair to earth somewhere close to the outer end of the cable, and be sure to connect the twisted pair in the cable to the line circuit in the switchboard, and be positive that you leave the ground connection off from the board circuits of such lines as are supposed to run metallic from the switchboard to the outer end of the cable. If your paper cable is so installed that moisture is liable to get into it during wet weather, it will be better to abandon the cable as quickly as possible and repair the defective portion. Answering your inquiry briefly, however, your No. 14 ground wire running to a three-eighths-inch pump rod is not a satisfactory arrangement. Change the ground wire first and then carry out the other suggestions offered above.

AGAINST THE TELEPHONE TRUST.

THE city council of Meridian, Mississippi, has adopted a resolution instructing the city attorney to take proper proceedings against the Cumberland Telephone (Bell) Company for violating the anti-trust law of the state. It is claimed that the Cumberland Telephone Company has violated the anti-trust law in that it has absorbed another telephone company and that it must forfeit its right to do business in the city and state. The action taken is considered as an ouster, which will, if it holds water, run the Cumberland out of business in Meridian.

MODERN TRAFFIC METHODS

A Paper Read Before the International Telephone Convention at Chicago

By J. P. Boylan

IT is only in recent years that the improvements in apparatus in connection with the subject of telephone traffic, have appealed to the management of a company. Before the traffic or service department was known of hardly any development along the line of an improvement in apparatus, to give superior service or to facilitate the handling of traffic, was apparent.

True, much engineering ability is and has been centered in perfecting the different apparatus used in connection with the telephone exchange, neither has expense been spared, in other ways, to bring about the perfect operation of the different apparatus used. But, somehow or other, that all important factor which would tend to minimize the manual work of the operator and reduce the percentage of traffic irregularity, not to mention the reduction of operating expenses by so doing, has not been given the study commensurate with the importance and possibility for improvement which is apparent to the traffic man.

The chain of reasoning which leads to the conclusion regarding the importance of this feature, is simple. The definite purpose of a telephone system is to supply telephonic connection and this consists of thousands upon thousands of daily calls. Each call consists of a certain number of operations; each operation involves a definite performance by apparatus and by a manipulator. Therefore, the special aim of the telephone engineer should be to put the apparatus and manipulators in a position to execute those various operations with minimum accuracy and celerity. The efficiency is the object to be attained, and efficiency of the connection requires efficiency in each step.

Until recently, very little time was spent by the average engineer on the traffic feature of a plant, and, consequently, the traffic manager was introduced to the switchboard for the first time when it was ready for operation, the assumption being that he could get the required results by various ways and means known to his art, providing, of course, that the switchboard equipment was up to the standard.

While the efficiency of the service, in a great measure, depends on a thorough knowledge and study of the minutest details involved in the handling of telephone traffic, it is, nevertheless, true that adding features in apparatus designed especially to facilitate the handling of traffic and lessen the percentage of error, has been the fundamental cause of a greater increase in efficiency. This being the case, I believe that a description of some of the features mentioned would be in keeping with my subject.

In a recently constructed manual plant, in a city of approximately four hundred thousand population, the consulting engineer, who prepared all plans and specifications, demonstrated that the traffic question, not only deals with the style and arrangement of a switchboard and its accessories, but enters strongly into the preliminary development study made, before the plant is built at all.

Prior to the drafting of plans and specifications for the plant referred to, the consulting engineer went into the traffic feature quite extensively and where certain improvements along this line could be made, consistent with the recognized standard, by which physical plants are built and switchboards constructed, they were added to and made part of the specifications. To commence with, it is a well known fact that the highest standard of service will always be found where the percentage of trunking is lowest.

A careful study of traffic irregularities, in general, proves conclusively that sixty-five and in some cases as high as eighty per cent were directly traceable to the trunking system employed for handling calls between local exchanges. To one who is familiar with the details of the work, it is evident that the possibility for error on a trunk call, multiplies to an alarming extent over that of a local call. The misplaced trunk irregularity alone, that greatest bugbear of all busy telephone systems, where trunking is employed, is perhaps responsible for more irregularities than all other trunking errors combined. It might be here mentioned, by way of illustration, that when the writer was in the employ of the opposition, he knew of one exchange in Chicago (the main office) which, when the number of telephones amounted to six thousand, with about sixty per cent trunking it ran between fifteen and eighteen hundred misplaced trunks per week. The best engineering talent of the A. T. & T. Co. has been concentrated on this particular fault for years in attempting to devise a new method or otherwise regulate it, but their efforts have thus far been fruitless.

Next to misplaced trunks the "Don't Answer" problem, on trunk connections, has been the source of constant annoyance to the traffic manager. It is a well established fact that out of the total trunk calls handled the per cent of "Don't Answers" will always be found higher than the local "Don't Answer" calls when compared with the total originating local calls.

The Pittsburg branch of the A. T. & T. Co. engineering staff has, for some months past, been making a study of "Don't Answer" calls on trunk lines, presuming that the trouble was due to some peculiar action of the lockout relay, but this theory has not been substantiated to date. In addition to the trunking irregularities mentioned, many others, equally serious, are known to exist.

Under these circumstances, therefore, the only possible solution of this problem seemed to be in reducing the number of trunking calls to a minimum, and to this end the exchange districts were so laid out as to provide that the majority of the calls handled in certain exchanges would be completed within the same exchange. It is estimated, and conservatively so, that the calls trunked out of the largest exchange referred to, located in the down town district, should not exceed ten per cent of the total originating calls.

When one considers that the average calls trunked by the opposition company, in this same city, averages sixty per cent, it can readily be seen what service will excel. It will be observed too that the feature of economy enters into this plan inasmuch as the "B" or trunking operator force is comparatively small. It is possible also when the percentage of trunking is low for the "A" operator to handle more traffic which seems that more lines can be terminated at a position and the natural consequence of all this would be a shorter switchboard for the given number of lines with many attendant economies. It also materially reduces the period of a completed connection and the gain of a fraction of a second on an operation, many times repeated each

day has in a large telephone system a cash value running into handsome figures.

The other features, worthy of mention, which will involve less mental and physical labor on the part of the operators will be the installing of a four-inch electric clock, mounted flush, on each "A" section of the switchboard. This will result in giving out the time to subscribers more accurately and permit the operator to devote her undivided attention to the keyboard, as it will not be necessary for her to turn around and look at the clock on wall.

The other feature which is also intended to promote team work amongst operators when answering subscribers' calls, especially valuable during the busiest hours without attracting the operator's attention to any extent from her own position, will be the installation of a green auxiliary pilot signal on each "A" operator's position. These pilots are so arranged that when a line signal comes in on a certain position, the green pilot lamps will operate on the two adjoining positions. Any operator, therefore, who is momentarily disengaged when this green lamp is operated on her position, is expected to look for the line lamp on the adjacent position and answer the call.

It is almost a universal custom for the chief operator to receive complaints of service and while she can handle such calls in a small exchange, it is obvious that in large exchanges much delay would be experienced by a subscriber waiting on the line for an explanation as to some irregularity being reported. To obviate this, the consulting engineer arranged to have the patrolling supervisor answer all calls from complaining subscribers which calls would originate within her district. Accordingly, a supervisor's jack was mounted on each section of the switchboard and a supervisor's district was arranged to include four sections.

Associated with these jacks is a relay and four pilot lamps, the opals of which are mounted flush on a blank multiple jack strip, one at the center position of each section above the multiple jacks. A supervisor, who desired to enter a complaint, would be connected by the operator with the supervisor's jack and the attention of supervisor would be attracted by the lighting of the large opals in her district. The fact that the supervisor is right on the ground would mean that she could investigate and give a waiting subscriber a satisfactory explanation of irregularity complained of.

This plan is thought to be much more desirable to that of having the subscriber enter complaint to chief operator only to have her refer same to the supervisor, who, after investigating, would report back to chief operator and she, in turn, to the subscriber.

Many other features, which will facilitate the work of the operating force have been the subject of study and when developed were incorporated in the plan of switchboard. The natural result will unquestionably be the rendering of a much superior service than would be given on a similar switchboard which did not have the advantage of these features.

One of the means in vogue by which the traffic manager has gauged the standard of service given in his exchanges, was to compile under various heads the traffic complaints received daily and summarize them in a way so that the item showing the heaviest complaint would head the report. Then would follow a study as to cause of certain complaints being excessive. A crusade, so to speak, would be inaugurated against the heaviest items and would usually result in considerably reducing the complaints of such items.

A better method than this is made possible by the installation of an observation board, equipped with listening-in lines on the positions of all operators, chief operators, monitors, number clerks, wire chief, etc., also on all in-coming and out-going order wires. This enables the traffic manager, through the medium of his observing clerk, to get in direct touch with the methods, courtesy and dispatch with which traffic is handled by the different employes.

The predominating advantage, however, is that before any irregularity can become prominent enough for the subscriber to note any complaint of same, it is detected and regulated through the medium of the observation board. In the same manner as a general inspection of telephones and switchboard apparatus obviates the possibility of mechanical trouble so also does the observation board minimize the possibility of service complaints. Its value in this particular line, as well as for many other purposes, cannot be adequately estimated.

MISTAKE OF GIVING FREE SERVICE

A Paper Read Before the International Telephone Convention at Chicago

By F. E. Ebersole

FROM the wording of the subject assigned me it is evident that telephone companies have at least awakened to the fact that free toll service is a mistake. The idea of free toll service, no doubt, originated with Independent companies trying for supremacy in their fights with the Bell, and since that time has been given to a greater or less extent by both sides of the opposition. If it were possible to limit the use of the free lines to actual patrons of the company there might be some excuse occasionally for its continuance; but, when once established, the general public takes advantage of the fact and the lines are burdened with traffic which no one can rightfully expect to be carried free; hence, to obtain results it is necessary to discontinue all free service.

This mistake has no doubt been made by quite a percentage of the Independent telephone companies in the United States who operate more than one exchange in the same county or community, and in a great many instances where the various exchanges operated in a particular community are owned by different interests. There are many objections that might be urged against free service, but the gist of the whole matter is, that the idea of giving something for nothing is based upon the wrong principle.

In the first place, the toll lines of a telephone company operating under present conditions are generally their only salvation when it comes to meeting dividends and fixed charges on the plant; and if this income is diverted by giving the subscribers the benefit of free service the ultimate result is generally failure. There is no reason why a telephone subscriber should be entitled to free service over a toll line, no matter what it's length, simply because he is paying for a telephone instrument. The rates for the rental of telephones are based upon what is considered a fair compensation for the one item of rental alone, and cannot include toll service, from the fact that it would be impossi-

ble to make a just fixed charge to subscribers for the use of an instrument and such toll service as they might see fit to use.

Secondly, it is an unjust discrimination against a certain percent of the subscribers to any exchange, from the fact that there is always a reasonable number who do not avail themselves of this free service; and if the rate paid by the subscribers who do use it is adequate for the service rendered, the rate paid by the subscriber who uses no toll service is in excess of what it should be.

When an exchange gives free toll service the burden on the company grows as the exchange grows, and the number of subscribers in the free zone increases. In any community where telephone service is furnished it is impossible to supply an adequate number of trunk lines to meet the demands for service upon which there is no charge; but in the same community the number of circuits necessary to handle paid business would equal about thirty to forty per cent of the requirements for free service, because of the fact that the lines are then confined to legitimate business, with the number of minutes consumed by each conversation cut to the minimum. Whereas, on free lines it is a hard matter to limit each conversation to the maximum time.

Hence, paid service would tend to decrease the number of trunks necessary to handle the business approximately sixty to seventy per cent, and at the same time increase the efficiency of the service. Decreasing the number of trunks would decrease the amount of necessary construction as well as the maintenance cost on same, and the revenue derived therefrom would not only take care of the fixed charges upon the toll lines in use, but would permit of net earnings being set aside towards meeting bond interest and dividends.

Free service tends to clog the entire system. It is the parasite of telephony; it saps the life blood of the local company; it produces no revenue but must be fed continuously; it reduces the net earnings, creates deficits, and increases expenses generally. It propagates avariciousness and causes continual ferment. It fosters parsimony; its value becomes so magnified that when one seeks to take it away he finds it bears a preposterous value to the community. It hampers business from the fact that the lines are clogged by neighborhood gossip during the busiest hours of the day, until the matter is forgotten or the business man is forced to use the mail. It means an increased number of operators, and a decreased efficiency of service. It represents an example of economic waste, a vast outlay and no returns. It becomes a liability when it should be an asset. Its introduction represents the laying of the corner stone of certain failure.

The majority of complaints regarding the service comes from a class who furnish no revenue to the telephone company, but impose upon their friends for this service. The larger the area covered, the longer the lines must be, hence, the greater value of the service to the public, and the greater the expense to the operating company. In a community where this class of service has been furnished for years, the problem of shutting it off oft-times becomes a serious one. The least intimation of interference with the assumed rights of the subscribers has met with petitions and demands that the service be retained, and with threats of removal of telephones.

The question arises regarding the best way of notifying patrons of the intention to restrict their privileges. In some cases this has been done by circular letter, again solicitors have been put into the field, and various other methods tried to bring about the change. Here is where the ability of the manager, who has made a study of local conditions and knows the people with whom he is dealing, comes into play. Tactful handling of the matter, with all absence of the "Public-be-damned" spirit, will bring out a principle of fairness in the general public which shows they do not expect even a public service corporation to run at a loss.

When the question of free toll service is taken up by mutual companies which have been organized with the express purpose in view of giving their patrons telephone service at lower rates than is possible by any other form of organization it strikes me as time to begin to look into this matter pretty thoroughly.

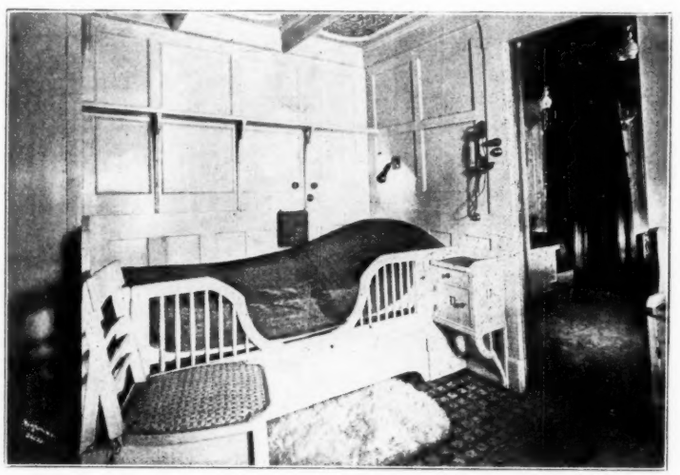
The following extract from a manager's report, read at the annual meeting of a large mutual organization held this month, shows very clearly that the free service has been burdensome to even the mutuals: "The United States Post Office Department is one of the most beneficent institutions of the age, and yet no postmaster is allowed to give away postage on a single letter that does not concern government business. In the same way a co-operative telephone company cannot give away service. It costs money to produce telephone service just as surely as it does to raise a grain of wheat; and that one or two small leaks in a boat may be pumped out, but a multitude of small holes in a ship's bottom means certain disaster."

The writer has found from experience that even the transaction of the company's business over the toll lines produces a burden of traffic that has a tendency to congest the lines to a certain extent; and that this privilege is abused by the employes generally, so that it becomes necessary, in order to bring about ideal conditions, to practically abate free service even among the company's employes.

I believe that the policy of operating companies should be to restrict this class of service in all territory where now in use, with a view of eventually wiping out the same, and under no circumstances allow any new territory to be opened.

TELEPHONES ON BOARD SHIP.

IN ALL ocean steamers which claim to be up to date the telephone now plays an important part. The accompanying illustration shows the telephone at the head of the bed



Telephone in cabin of ocean liner.

in a cabin of the steamship Kronprinzessin Cecilie of the North German Lloyd line. The instrument enables the passenger to communicate with the steward's and purser's offices and other parts of the ocean greyhound.

Comment is made on the number of Independent rural telephone companies being incorporated in Ontario, says the Montreal Gazette. The people who think that nothing of a semi-public nature can be attempted without government aid and direction are seemingly confined chiefly to the cities and the newspaper offices. The healthy men who do things for themselves are in the country, and there are lots of them.

Practical Suggestions on Construction Work

By Bernard C. Groh

THERE is a well-known maxim that "The cheapest is not always the best, but the best is always the cheapest." This can be changed in telephone engineering to read, "The method that is the cheapest per year is more economical."

When the question of the advisability of adopting a certain type of construction in telephone work arises, not only the initial cost of each type of construction deemed practical should be considered, but the annual cost should also be carefully estimated. The proposed method that shows the lowest annual cost is almost invariably the proper method to employ for the construction work contemplated.

The term annual cost (more often referred to in engineering studies as annual charge) is the cost per year of the work involved in the construction of the plant and is made up of the following items: (a) Interest on the investment; (b) depreciation; (c) maintenance; (d) taxes (if any).

Interest is the sum paid each year for the use of the money invested in the plant. It is usually figured as six per cent of the average value of the plant depreciated from year to year. In telephone construction work this average interest is usually considered as amounting to approximately from four to four and one-half per cent of the original investment.

The term depreciation is the value lost from the plant each year and varies, of course, for the various items involved in the outside construction. The factors entering into the calculation of the depreciation of an item in construction are the available life of this particular item, and its junk value after it has outlived its usefulness for the purpose for which it was originally designed. The junk value is that sum which, it is estimated, can be realized on the material after the cost of removal and marketing is deducted.

For example, if a certain portion of the plant has an estimated life of twenty years with no junk value, the depreciation is therefore five per cent. If it is estimated that it will be possible to realize thirty per cent of its first cost as junk at the end of twenty years, its depreciation will be only three and one-half per cent, instead of five per cent.

Maintenance is the cost per year necessary to keep the plant in serviceable condition. In many engineering studies the maintenance charge is estimated from past records in dollars per year instead of a percentage of its initial cost, but in the table which is given below the maintenance is given as a per cent. The per cent given has been found after a careful study of the maintenance cost of the various items of outside construction to be fairly accurate.

Taxes vary with the locality and the method of assessment. For usual conditions, the annual charge for this item is usually estimated at one and one-half per cent of the original cost.

It will be seen from the above that the depreciation and maintenance cost are features of considerable importance in calculating the annual charge on construction work. A certain plan of construction may equal or exceed another in initial cost, but the annual cost may be lower, making it the more economical type to employ for the work in hand. It must be borne in mind at all times, however, that in some cases it may not be possible or desirable to adopt the method proven by annual cost to be the more economical. For example, it may be proven that aerial cable construction is the advisable type to employ in a certain work, but anticipated underground city ordinances may make underground construction necessary at such a near future that it would be bad policy to employ the type of construction that has proven to be the more economical from a standpoint of annual cost.

In estimating the annual cost on an investment, the annual cost of each item should be considered. The manner in which outside construction is usually subdivided by telephone engineers together with the item involved in the annual cost of each subdivision, is shown in the following table:

Item—	Average Interest.....	Depreciation...	Maintenance...	Taxes.....	Total.....
Aerial cable	4.0%	6.0%	3.0%	1.5%	14.5%
Underground cable	4.5%	3.5%	2.0%	1.5%	11.5%
Pole line	4.0%	12.5%	4.0%	1.5%	22.0%
Cross arms	4.0%	12.5%	4.0%	1.5%	22.0%
Bare copper	4.5%	5.0%	5.0%	1.5%	16.0%
Insulated copper	4.0%	9.0%	3.0%	1.5%	17.5%
Suspension strand	4.0%	8.0%	3.0%	1.5%	16.5%
Terminal boxes	4.0%	8.0%	3.0%	1.5%	16.5%
Conduits and manholes	4.5%	2.0%	1.0%	1.5%	9.0%
Galvanized iron wire	3.5%	10.0%	5.0%	1.5%	20.0%

By the use of the above data the relative economy of various types of construction for a particular work may be determined. Of course in estimating to a greater degree of refinement for replacement work where the present, or a portion of the present, plant has not outlived its usefulness, the cost of transferring the present materials to other work must be considered. However, for the ordinary problems that confront the operating company the figures and data given above will enable it to ascertain very closely the most economical construction to employ in its work.

NEW BUILDING AT BERKELEY.

PLANS are being made for the erection by the Home Telephone Company of Berkeley, California, of a steel framed building to cost $40,000. The building is to be situated at the corner of Milvia and Allston way. The material is to be brick, with steel frame and concrete foundation. This will be the most important step in the establishment of the Home Telephone Company in that city. For some time past the company has been at work laying conduits for underground wires. The company will be in full operation there within a few months.

When the telephone wires are overland the speed of transmission is at the rate of 16.000 miles a second; where the wires are through cables under the sea the speed is only 6,020 miles a second.

MEASURED SERVICE

Byron B. Brockway.

OF ALL public utilities, gas appears to have been the only one charged for from the beginning according to quantity consumed. Until recently it was a common practice, and is yet the custom in many places, for water companies to charge according to the number of rooms in a house or number of front feet in the lot; now the modern practice is to charge a certain rate per thousand gallons. It was formerly the rule for electric light companies to charge for current according to the number of lamps connected, but now an up-to-date company charges according to watts or the actual quantity consumed.

The pioneers in the telephone field, who, by the way, were the various Bell licensees, not having at the time the telephone was first brought into commercial use apparatus by which the number of calls could be accurately recorded, adopted the expedient of charging for the service an arbitrary rate per month, having a higher rate for the business than for residence telephones. This practice still largely obtains among the Independent companies, but the Bell licensees are breaking away from that custom as rapidly as possible. Especially is this true of the large cities.

There are several reasons for making the change—it yields a larger income per telephone, increases the list of subscribers, and last, but not least, rids the patrons of that intolerable nuisance known as a "dead head," who uses the service in many cases more than a regular subscriber without paying therefor, and ninety-nine times out of one hundred not only fails to show his appreciation for the convenience by thanking the company or subscriber, but is loudest in his denunciation of what he is pleased to call "the rotten service" the company is furnishing.

Many of the Independent companies have profited by the mistakes of the opposition companies, but I am sorry that there are a large number who have not made the most of their opportunities. We are now able to purchase telephone apparatus, that as far as their signaling and talking qualities are concerned seem well nigh perfect, and are certainly equal, if not superior to, anything used by the Bell licensees. This being true, why should we hesitate to adopt measured service? It is certainly fair to both the patron and the company, and I see no good reason why the change should not be made.

For a number of years the word "Independent" has had a wonderful influence upon the people, and during that time they have given us their confidence, good-will and money, and are now not only requesting but in many cases are demanding that they be furnished not only with first-class but modern service, embodying the latest ideas. It is, therefore, plainly a question of the survival of the fittest, and if we expect to remain in this business it is only too evident that we must be continually on the alert for and introduce the latest and most approved type of apparatus, and inaugurate such changes in the handling of and charges for telephone service as seem appropriate and satisfactory to the public.

"I believe that the majority of our subscribers would welcome a change from the present flat rate system to the "pay for what you get" principle. It may be, however, that the apparatus for recording the number of calls is not sufficiently perfected to warrant our making this change, but, as necessity is the mother of invention, I confidently believe that if it is shown that the apparatus now available for this purpose is not efficient someone will soon place on the market an instrument that will meet our requirements."

The foregoing paragraph is from a paper read at one of the Independent telephone conventions. I wish to emphasize the last sentence in order to call especial attention to the recording apparatus itself. Assuming that we are agreed that we should furnish our patrons measured service—what type of meter shall we use? What has the practical experience of telephone companies that have actually furnished such service demonstrated as desirable in a measured service meter? And what has been proven undesirable and to be avoided?

The following specifications, compiled by one who has made a special study of measured service meters, will aid in answering these questions:

SPECIFICATIONS FOR MEASURED SERVICE METER.

1. It shall be neat and attractive in appearance, well designed and made in every detail.

2. It shall be readily attachable to all the various types of telephones—wall, desk, corner-cabinet, crane, etc.—without the use of special clamps, plates or other parts.

3. It shall be so constructed that the chances for trouble will be reduced to the lowest possible minimum.

4. It shall be so constructed that, in case it should get out of order, it will not put the telephone out of commission.

5. The counter shall be so located that it can be readily seen by the subscriber at any time.

6. The counter shall be so made that it will be quite impracticable for the subscriber to reset it maliciously.

7. The mechanism shall be so arranged that the counter must register a call every time a signal is given.

8. The signal shall be neither too long nor too short.

9. The signal shall be neither too loud nor too faint and must be such that it will work equally well on long lines and on short lines.

10. The signal shall be pleasant to the ear and shall be such that it cannot be successfully imitated by the subscriber.

11. No ground wire shall be required for the operation of the meter.

12. The least possible amount of special equipment shall be required at the central exchange to operate in connection with these meters.

13. It shall be capable of being removed from telephones without leaving screw holes, wire holes or other unsightly marks upon them.

14. The meter shall be designed to be mounted directly on the telephone—not on a wall or desk near the telephone.

15. The lever or button that operates the signal shall be so arranged and located that the subscriber can operate it without the slightest difficulty or inconvenience and the

meter shall be made of as few parts as possible consistent with the successful operation of same.

16. The meter shall be so made that it will not be affected by changes in the weather, etc., more than are transmitters, receivers, etc.

17. Every part of the meter shall be so designed and made that it should, under ordinary conditions, work continuously and without giving trouble, for a number of years.

18. The meter shall be designed to work equally well on both common battery and magneto type telephone systems.

Some telephone men, I imagine, who have not spent much time looking into the subject of measured service meters will be quite surprised at the number of things that a good meter should and should not do. Let us look into the above specifications, one by one, and see why each point should be considered.

1. The appearance of the meter should compare very favorably with that of the telephone itself. In fact, the meter should appear to be a part of the telephone upon which it is installed. It should not impress the subscriber as being an afterthought, made of most anything and stuck onto the telephone any old way.

2. Here is a very important point. How many meters are there on the market to-day that can be attached with equal facility to any type of telephone? Most of them are designed to be screwed to the woodwork of wall and corner cabinet telephones and fastened to desk telephones, crane telephones, etc., by clamps, brackets or other devices that are more or less expensive and troublesome to purchaser, keep in stock, attach to the telephones, etc. The ideal meter can be attached to any type of telephone, easily, quickly and without the use of extra clamps, etc.

3. There must be no delicate mechanism in the meter to break, stick, get out of adjustment or cause trouble of any kind. Every part must be so designed and made that the chances for trouble will be very small indeed.

4. A very large percentage of the measured service meters are used on party lines and it is a very common occurrence for an entire line to be put out of service on account of trouble in one of the meters, connected to the line. Any meter that is connected electrically to the telephone circuits is liable to "short" or "open" the line. When the meter gets out of order and "shorts" the line no telephone on that line can receive or send calls and it takes some time for the trouble man to locate which telephone is the cause of the trouble and repair same. An "open" is not so serious as it usually affects only the one telephone to which the meter is attached. But even in this case the subscriber cannot use his telephone for business or to report trouble. Practical experience covering several years has demonstrated that all "request type" measured service meters should use mechanical means for signaling to the operator that the call has been registered and that connecting the meter in any way with the telephone wiring should be avoided. Then if the meter does go wrong the line is not affected in any way and the subscriber upon whose telephone the meter is attached can still use his telephone to report the trouble, receive calls by special arrangement for such cases.

5. Telephone companies that have used meters located at the exchange instead of at the subscriber's instrument have experienced almost no end of trouble because the subscribers, who cannot see the meters, believed they were being overcharged. The only place for the meter is right where the subscriber can see it every time he uses the telephone and then he knows at all times just how many times his telephone has been used. No subscriber will accuse the telephone company of overcharging him for excess calls when he has the meter continually before him and sees every call registered.

6. In some few cases subscribers have been known to try to reset a meter so they would show less than the actual number of times the telephone had been used. There are several ways of making this practically impossible for the average subscriber. The simplest and most satisfactory method, however, seems to be to simply use a high reading meter, say to 99999, which will take so long to operate to its limit, to zero, and up to the desired number again that the subscriber will not attempt to do so.

7. With some types of meters the subscriber found that by pushing the lever or button as far as it would go, they signaled the operator and registered the call; then by wedging the lever in that position with a match or toothpick, they could give another satisfactory signal at some later time without registering same thus being required to register only half of their calls. A first-class meter will not permit this to be done. It registers every time it gives the registering signal to the operator.

8. Another trouble has been that the signal would continue buzzing or ringing for seconds longer than necessary, which delayed conversations and proved very annoying to the subscribers. High-grade meters are provided with suitable dampening devices to limit the time the signal operates

9. Some meters, especially those connected to the telephone wiring and using buzzers operated by current from central, make sounds much too loud—actually painful to the operators and subscriber's ears—when connected to short lines and, on the other hand, make such faint sounds that the operator cannot be sure she has heard them or distinguish them from "false" signals when connected to long lines.

10. The best signal for a measured service meter is one that is musical, pleasant to the ear, and impossible to imitate successfully. It should be so distinctive that the operator can detect instantly and certainly any attempt to deceive her on the part of the person using the telephone.

11. During the last three or four years party line signaling systems have been so perfected that any one of four or more telephones on the same party line can be called without ringing the bells at the other telephones on that line, and this without a ground wire. Therefore, in a great many cases, if the meter required a ground wire, a special wire would have to be run when the meter is installed. The meter, for this and other reasons, should not require a ground wire.

12. Some meters require a large amount of special equipment at the exchange to operate in connection with them. The ideal meter should require the least possible amount of such equipment which is expensive to install and maintain.

13. Practical experience has demonstrated that a comparatively large number of subscribers to measured service sooner or later request to be changed to unlimited service. In most cases of this kind it is only necessary to remove the meter from the telephone and connect the wires from said telephone to an unlimited line. But where meters are screwed to the backboard of the telephone and two or three holes for wires have been drilled through said backboard, the telephone looks very badly after the meter has been removed. In fact, we know of instances where the telephone company sent out new telephones to replace the telephones with meters screwed to them in these cases. Then the old telephone had to be thoroughly overhauled and refinished in the shop before it could be installed again, for some new subscriber. Meters are now manufactured that, when removed from telephones, they leave absolutely no holes or marks of any kind to show that a meter had ever been attached to the telephone.

14. There are some types of meters, too large and clumsy to be attached to desk and crane telephones, that must be screwed to a wall or desk near said telephone. Such meters must be connected electrically to the telephone and require considerable wire, time, etc., when being installed. The meters, wiring, etc., frequently get int

trouble and the troublemen experience more or less difficulty in locating the loose connection, poor adjustment or other cause of the trouble and getting same into good condition again. Frequently, too, the subscriber finds it inconvenient to reach and operate the meter from the position he happens to be in when using the telephone; when he is standing, for example, using a portable telephone with a meter located inside a roll-top desk.

15. It is surprising to note how far some meter manufacturers depart from these two requirements. Some meters contain almost as much mechanism as an ordinary clock. And the trouble that they get into seems to increase about as the square of the number of parts. Again we say, with emphasis, let the measured service meter, as well as the subscriber's telephone, be made of the fewest possible working parts.

16. We have seen meters installed on telephones in rather damp places where the telephones worked perfectly month after month but the meters would soon become rusted or corroded and some part or other would stick, fail to operate properly, and then would follow complaints from subscribers, visits by the troublemen, etc.

The meter must not be unduly susceptible to moisture, changes of temperature, etc.

17. No service meter should contain delicate contacts or other parts that will wear rapidly or require more or less frequent adjusting. Many a case of trouble has been caused by springs too small for their work, screws and nuts that work loose because not properly locked, etc.

18. Many large telephone companies operate magneto type systems in the small towns surrounding the cities in which their large common battery systems are located. These companies should use a type of measured service meter that will work equally well on both kinds of telephone systems. By so doing only one kind of meter need be kept in stock, and the operators need get used to only one meter signal.

In conclusion the writer wishes to say that, while a surprisingly large number of things required and things to be avoided have been discovered during the development of the measured service branch of the telephone business, the art has now reached that stage of perfection where it is now possible for telephone companies to purchase, install and maintain measured service equipment in connection with both common battery and magneto telephone systems that is about as nearly perfect as any kind of apparatus can be made.

EQUITABLE CHARGES FOR SERVICE

A Paper read before the International Independent Telephone Convention at Chicago

By W. H. Crumb

IT MUST be assumed that all who have engaged in the business of supplying Independent telephone service have done so with the primary object of securing a safe and profitable means for the investment of capital. We cannot believe that any of us have been so philanthropic as to have engaged in this business for the sole purpose of delivering the public from the clutches of the monopoly and furnishing it with telephone service at a price which is not sufficient to meet the actual cost of producing that service plus a reasonable return upon the money invested.

The art of communicating by telephone is one of the most useful economic agencies devised by man, the development of which imposes a great duty upon those who undertake the furnishing of such service; and in order that this duty may be faithfully performed it is absolutely necessary that the charges for furnishing service should be uniformly just and reasonable, and should insure a reasonable profit on the investment. No company engaged in such a beneficial undertaking as this should be wrongfully guided or compelled, either of itself or through legislative regulation, to adopt or put into force rates which will not insure a reasonable profit, for by so doing the development of this great and useful industry will be seriously retarded, and its benefits denied those who are entitled to them.

The demand for telephone service is extensive and varied. The company supplying it must be prepared to take care of the requirements of a range of patrons as wide as the range of the district in which it operates. It must provide apparatus for the service of each class of patrons which will enable it to furnish service to each subscriber at an appropriate price within his means. It is desirable that the prices be graded so that the large user shall not pay less than his fair share of the expense for furnishing the service and remunerating the company for its investment; and equally so that the small user may get his service at a price which is within his means and yet is reasonably remunerative to the company for its outlay. The great problem which confronts all telephone companies of to-day is that of supplying a good quality of telephone service to the small user at a price which he can afford to pay and still leave a fair margin of profit to the company.

There are two general methods which have been adopted by operating companies of charging for telephone service, namely, the flat rate method and the measured rate method. It is my purpose to briefly describe a few of the merits and demerits of each of these methods.

The flat rate method is survival of the idea that the telephone company rents apparatus and telephone lines, and is based on the theory that the cost of providing service for any subscriber in a particular class of service will be very nearly equal to the average cost in that class of service. When the flat rate method is used telephone subscribers are ordinarily divided into two classes, namely, business and residence. These classes may, however, be further subdivided by placing two or more upon a party line; such subdivisions being made upon the basis of the amount of equipment required for each subscriber rather than upon the actual requirements for service.

All flat rate subscribers are authorized to make unlimited use of the facilities furnished them, and all subscribers to the same class of service are presumed to pay the same price. Very little experience in furnishing telephone service will show a wide difference in the individual use of the telephone by subscribers, even among those who subscribe for the same class of service; and the reason for the equality in price charged subscribers to the same class of service lies only in an assumption, that the expense of the service is almost altogether a matter of providing lines and apparatus, and that the cost of providing each subscriber's service

is practically the same for all subscribers in that particular class.

The greatest range of rates that it is possible to make with a flat rate arrangement is relatively small. The difference between the highest paying flat rate subscriber and the lowest paying flat rate subscriber being relatively small, tends to retard telephone development and prevent its general use. Assuming that the total receipts of a telephone company operating under flat rates are sufficient to pay the cost of operating and maintaining the service and produce a reasonable profit on the investment, it is evident, on account of the very unequal use of the service by the different subscribers, that the small users manifestly pay more than their service requires, while the large users, who keep their telephones constantly busy, receive a service of much greater value and more expensive to the company than is justified by the annual amount which they pay. The large use of busy flat rate lines interferes with the traffic of the small users by keeping the former lines so busy that the small users are unable to conveniently get into communication with them, thus causing unavailing calls, which are expensive to the company and annoying to the subscribers.

Experience shows that, within certain limits, the average use of a telephone increases as the number of telephones connected with the system increases, and also that the individual use of a very large number of telephones increases very greatly as the size of the system increases, so that the variations in use in a large system are very much greater than those in a small one. Equitable flat rates may be established for small systems where the individual use in the different classes is very nearly equal to the average use for the class, but it is also the experience that these rates, which may be equitable and profitable considering the number of telephones for which they were established, become more and more unprofitable as the system grows in number of telephones connected, this being due to the increased use in all classes of service. It is this fact, which has now become well recognized by all Independent telephone operators, that has made it necessary for so many of them to undertake to increase their rates.

One of the most serious drawbacks to the development of Independent telephony has been the mistaken policy of Independent telephone companies of accepting franchises stipulating rates based upon a development which is far below that which may be expected a few years hence. It is this condition which has recently led promoters to establish a sliding scale of rates in their franchise applications, which automatically increase as the plant grows. We all know, or think we know, how hard it is to popularize a uniform increase in flat rates for telephone service, even though such increase in rates is absolutely essential to the further development of the business.

The term measured rate service ordinarily means service which is carried on upon the assumption that the telephone company is organized for the purpose of giving telephone service as distinguished from the renting of instruments. It is of course obvious that the company must furnish its subscribers with suitable telephone instruments and lines, and also provide the necessary equipment for making connections between subscribers' lines, which are supplied purely for the purpose of enabling subscribers to transmit messages between each other with the greatest practicable convenience and dispatch. It is the business of the company to provide means for the transmission of messages, and measured rates go upon the assumption that the telephone company should be paid for the performance of this specific service.

Since it is necessary for the company to go to considerable expense to provide the subscriber with facilities for the transmission of messages, it is appropriate for the company making measured rate charges to exact a guarantee that there shall not be less than a fixed minimum of number of messages, or that the rate paid shall not fall below a certain reasonable amount per annum. This amount usually includes the transmission of messages up to an appropriate number, over and above which an additional charge may properly be made per message. The ideal method of charging for telephone service is obviously to charge the subscriber in proportion to the service which he receives, and to make the charges to all subscribers as low as is consistent with the operation and maintenance of the property and the payment of a fair return on the money invested. The measured rate arrangement manifestly makes it possible to reduce prices to the small telephone user to the smallest possible annual charge, that is, to a charge which is just sufficient to cover a reasonable interest and depreciation for the portion of the plant that must be set aside for the individual user (or the average of the users of his particular class) increased by an amount which is proportional to the actual number of messages transmitted from his telephone in a year. It is only by this arrangement that large city service can be extended to small business men and small residence and apartment dwellers, whose demand for service may not warrant them in paying more than $18 to $24 per year, and this sort of subscriber constitutes a remarkable proportion of the total telephone using population of a large city.

In all other lines of business where articles or service are sold the selling price of each article or class of service is based upon the cost of producing the particular article or class of service rendered. It is true that in some cases these items of cost are based upon averages, but they are usually determined from detailed knowledge and in such a way that, where averages are used, cost prices are arrived at with considerable accuracy. Strange as it may seem, telephone companies have made no successful efforts to arrive at the detailed costs of furnishing the different classes of service, and the problems relating to each class of service and the proper charges for different classes of service have not been worked out in a suitable manner. The telephone companies have apparently been so busily engaged in the extension of their business and the extension and improvement of their plants that they have not found men or time to work out the details of operating economies and the best methods of handling service of different classes of subscribers in the way railroads, traction companies, electric light companies and various other public utility corporations have been working out the details of economy relating to the processes of their operation. Records have not been kept in such detail nor in such manner as to afford appropriate data for fixing rates, and in every instance telephone rates seem to have been dictated by estimates based upon experience or the requirements of business expediency, instead of being founded upon a knowledge of the cost of producing different classes of service. Telephone companies seem to go upon the belief that their business is satisfactory if the total receipts of a year's business show a profit, and they have heretofore neglected to consider more than superficially the essential question of whether the rates charged dealt fairly by the different classes of subscribers. It is an unfortunate condition in the telephone business that the telephone instrument should be generally adopted as the unit upon which telephone rates are based instead of the telephone message, the instrument being provided simply to enable the subscriber to transmit messages.

One of the great advantages of the measured service system of charging is that after the guarantee and message rate is properly and equitably established no company need feel afraid of having its system grow, because those subscribers whose rates should be increased with the growth of the plant will, through their increased use of the service, increase the amount which they pay for the service.

Digest of Telephone Literature
Conducted by E.M.Rothelle

[This digest includes the telephone articles printed in technical and scientific publications in all civilized countries. It is a complete index to the world's telephone literature. All publications are given numbers. The title appears first followed by author's name, number and date of publication; for example: 122-1-25-08 is Electrical Review of date January 25, 1908. Those desiring any article in this digest should address the publication whose key number is given below. The publications reviewed in this issue follow.—Editor.]

101—Telephony, Chicago.
102—Sound Waves, Chicago.
115—Electric Club Journal, Pittsburg, Pa.
121—American Telephone Journal, New York.
125—Electrical World, New York.
129—Scientific American Supplement, New York.
134—Telephone Age, Toronto, Canada.
142—Electrician, London, England.
143—Electrical Engineering, London, England.
144—Electrical Engineer, London, England
161—Swachstromtechnick.
162—Electro Technischer Zeitschrift, Berlin, Germany.
163—Electrotechnischer Anzeiger, Berlin, Germany.

Telephones in the Canal Zone. W. J. Rodman. 102—1-1-08. Mr. Rodman, who has charge of the telephone systems in the canal zone, presents an interesting communication, regarding the work done in the direction of telephone and telegraph installations made in the zone. Central energy switchboards are about to be installed.

Telephone and Telegraph Pole Statistics. 161—1-1-08. The Austrian government made a number of tests during 1906 in connection with the lasting qualities of telephone and telegraph poles with particular reference to the effects observed in applying preservatives. The average life of poles installed in Austria is equal to about 11.8 years. In Germany it was found to be equal to 11.7 years. The article appears in the German language.

Police Signal System. C. A. Knowles. 121—2-8-08. An illustrated description is presented of a police telephone system installed in North Tonawanda, New York. The telephone apparatus of this system is all operated upon the common battery plan, and all apparatus is multipled, one feature being that no taps are made upon the through circuits, the wires being brought directly into the box.

Rules for Operating Room Employes. K. Weisinger. 121—2-8-08. This is the concluding section of a series of articles by Mr. Weisinger. In this final installment, operating methods as applied to desk equipment are discussed with brief mention of operating methods on the B boards. The series have extended for a number of months and are of considerable interest, particularly when referred to in connection with the rules compiled by the International Independent Telephone Association.

Efficiency of a Telephone. F. H. Abraham and D. Charbonnell. 125—2-1-08. This is an abstract of an article discussing the efficiency of a telephone and assumes that for a given sound the microphone behaves as an alternator without inductance with an internal resistance of about ten ohms. At the receiver, the line acts as an alternator. It is stated that an efficiency of 90 per cent should be attainable with suitable modification of the apparatus. It is thought that improvements of the microphone offer a very promising field and that existing types of microphones are capable of greater improvement.

Selective Ringing System. R. Heilbrum. 162—1-2-08. This system is a form in which a wire coil placed in the upper portion of an inverted U-tube expands the air and therefore forces a liquid in the remaining limb to such a height that a local circuit is closed and a bell is rung. This is a sort of a hot wire instrument.

Rules for Operating Room Employes. K. Weisinger. 121—2-1-08. In the present installment of the series, handling of calls from pay stations and general instructions for handling tickets are discussed. As appears elsewhere, these series of articles have been concluded.

Application of the Microphone for Detecting Fish in the Sea. 129—2-15-08. This is an interesting discussion in connection with the application of a microphone enclosed in a steel box and submerged in the water for the purpose of giving notice as to the numbers and kinds of shoals of fish and thus serve as a guide to the fishermen. It is stated with the close proximity of the herring produces a whistling sound in the telephone; the cod records its presence by a howling sound and other kinds of fish produce a growling noise. It is stated that the noise is due to the movements of the fins and scales of the fishes.

The Working of Poulsen's Wave Generator. P. Barreca. 142—1-17-08. It will be recalled that the Poulsen invention is applied to wireless telegraphy and also recently to wireless telephony. In the present abstract of the article, the different effects are discussed and different experiments made by the author, he using one copper and one carbon electrode, the latter rotated by clock work, and the arc was burned in hydrogen which was carburetted by bubbling through benzine.

Wireless Telephony in the United States Navy. 142—1-17-08. A short illustrated description of the equipment installed by the United States Signal Corps. Messages were exchanged up to a distance of fifteen miles, and when the Pacific fleet sailed, communications were maintained up to thirty miles.

Some Modern Types of Thermophones. F. Weinberg. 142—1,17-08. After drawing attention to Sir William Preece's experiments of 1883, the author discusses the method adopted by him in his experiments. Several illustrative diagrams are presented.

History of the Automatic Telephone. A. B. Smith. 102—1-15-08. Mr. Smith's series of articles upon the historical developments of the automatic companies has already been referred to before. In the present installment, which is well illustrated, attention is given to the Erickson and Lundquist inventions, and the work of Mr. Keith is also reviewed.

The Vacuum Type of Lightning Arresters. F. Ambrosius. 161—1-1-08. It is found that when most of the air is exhausted from a receptacle containing two conducting surfaces forming electrodes that an electric discharge will readily pass between the two electrodes, more readily than would be the case with ordinary air pressure. Of course when we produce a complete vacuum, which it may be safe to assume has not yet been accomplished, then there should not be any flow of current. While the article does not state it, it is possible that a certain gas is admitted into the so-called vacuum space. The article further discusses protection against strong currents, sneak current and atmospheric discharges.

Recent Patents in Wireless Telegraphy. W. H. Eccles.

142—1-24-08. This article is of interest to those who are studying wireless telegraphy and telephony. The illustrations are very well executed and consist generally of circuit diagrams. Another installment of the article will appear at an early date. It is to be understood that the patents described are British and not American.

Advances in Telegraphy and Telephony. 163—1-12-08. Four times a year this publication briefly discusses the advancements in the telegraph and telephone arts during a given quarter. In the present article long distance work and switching apparatus are discussed. Also automatic exchange systems and methods for controlling the length of conversations in order to provide for a charge upon the basis of actual time consumed in carrying on a conversation. This portion of the article is very interesting, as it is discussed in connection with existing attempts to operate such systems.

Automatic Telephone Exchange. F. Lubberger. 162—12-12-07. Mr. Lubberger, who is with the Automatic Electric Company, discusses the most recent applications for extending and reconstructing existing telephone exchanges.

Electric Lighting and Other Electrical Applications in 1907. 142—1-10-08. After discussing the application of both wireless systems, telephony is referred to in connection with both wireless developments and also long distance transmission systems. The recent paper upon the theory of telephone transmission presented by Messrs. Cohen and Shepherd is referred to as being an interesting advance of the scientific progress of telephony.

Magneto Telephone Design. W. A. Taylor. 134—1-1-08. Mr. Taylor is presenting a series of elementary articles upon telephone design. At present he is discussing the single cord switchboard systems and also refers to systems of switchboards where two cords are required for completing a connection.

Telephone Lines and Railway Crossings. 134—1-1-08. Dr. Doan, vice-president of the Canadian Independent Telephone Association, presents a series of regulations affecting the running of lines across railway crossings, erection of poles, etc. The regulations are divided into different sections, and cover general construction, railway crossings, specifications and a form of instructions to be used by the telephone companies in dealing with railway companies.

New Trunk Telephone Exchange at Bradford, England. 143—1-9-08. Publishers of electrical journals in England appear to have a great faculty for obtaining interesting information whenever new telephone exchanges are installed. In the present article a complete description of the new sixteen section combined toll and transfer switchboard is presented. Two views showing the front and rear of a portion of the switchboard and four circuit diagrams show the application of phantom circuits, while a drawing shows the general arrangement of the apparatus in the building. One interesting feature in the construction of the switchboard consists in the multiple portion of the board being separately enclosed from the cord circuit apparatus, the enclosing being effected by sliding doors of metal. Any student of telephone progress should carefully watch the developments now going on in England in the direction of telephone exchange apparatus and circuits.

Protective Relays. M. C. Rypinski. 115—1-1-08. While this is not strictly a telephone article, it contains items of interest to the telephone designer. Standard types of protective and auxiliary relays are described. Alternating current circuit protecting relays are referred to as well as direct current overvoltage relays. This article is the first of a series and may be read with profit by anyone having anything to do with the designing of power apparatus.

Developments of a New Invention. Dr. A. Korn. 161—12-1-07. Since the invention of the telephone, one of the problems which has presented itself to inventors is the transmission of pictures by electricity. It is now found that not even a wire is necessary for transmission of pictures from one point of the earth to another, and perhaps some day it will be possible to use a telephone and at the same time have a picture of the correspondent before one, and it may not be necessary to have even a wire connection between the two correspondents. The author discusses the development of the systems of transmitting pictures by electricity and illustrates his discussion in a brief manner. In discussing the future, the author suggests that the first problem, which it is necessary to solve, is the transmission of groups of persons and landscapes. After this has been done the transmission can be extended to long distances—even between America and Europe, and after this will come the natural developments of increasing the perfection of the apparatus to such an extent that only a few seconds of time will be required for transmitting a complete landscape or group view, and in the far future with perhaps no immediate hopes of solving it, we shall be able to actually see distant objects as we now see objects in our immediate surroundings.

Selective Signaling. 144—1-17-08. A recent invention made by an European inventor consists in selectively operating either mechanically or electrically a series of reeds. This invention, it is stated, is applicable for recording melodies in musical notation or speech in ordinary letters. In the application of this system to party line systems each station is provided with a generator which may be revoled at different rates of speed and operate a series of tuned springs exposed to the action of the electromagnet. In order to call a certain station, it is only necessary to operate the generator at the correct speed and project the current over the line circuit when it will operate the reed tuned to the frequency of the current projected over the circuit. It is stated that the current impulses may also be generated by means of a microphone which may be set in action in any suitable manner, such as tuned whistles or sirens.

Magneto Telephone Design. W. A. Taylor. 134—2-1-08. The action of a magneto drop together with night bell contacts is described. The article has been running for some time, the present installment containing the forty-fourth illustration. Mr. Taylor handles this subject in a very easily understood manner.

Long Distance Wireless Telephony. 161—1-1-08. It is stated that very shortly a system of wireless telephony will be established between Denmark and Germany. It has been found possible to hold a conversation between stations over 230 miles apart. It is perhaps not well to belittle the efforts at long distance telephony and the day may not be far away when we shall at least experimentally carry on a telephone conversation across the Atlantic ocean.

"HELLO" GIRL A BOY.

ACCORDING to a report from St. Louis there was consternation among the girls of the Forest exchange of the Bell telephone company when it became known that "Helen" Iles, a fellow worker, was, by her own confession, not a girl at all, but a boy in disguise.

The secret was brought to light when one of the girls complained to the chief of the exchange, Miss Burns, that "Helen" was not what she seemed. Miss Burns brought "Helen" on the carpet and the operator was discharged from further service.

"Helen" applied for the position five months ago, giving the name of Helen Iles, age 22, of Chicago. A few weeks ago a new operator, whose first name is Margaret, was assigned to the exchange.

"Helen" forgot his disguise, told Margaret he was a man, and asked her to marry him. Margaret refused and immediately sought Miss Burns, the result being that "Helen" was out of a job.

TELEPHONE REQUIREMENTS IN CANADA

A Paper read before the International Independent Telephone Association at Chicago

By F. Page Wilson

IN STANDING before you today and attempting to tell you a little about the status of the Independent telephone movement in the Dominion of Canada, I feel rather in the position of the little fellow just home from his first term at school, and who is just craving to tell his big brother in the sixth form all about the wonderful things he has seen and the marvels he is doing every day. For you, gentlemen, are past masters in the Independent movement. I will not say that even you yet know it all; for in a huge country where the net results of a short ten years growth is 7,000 Independent companies, and where the increase in one year was, I understand, no less than 1,800 new companies, it will readily be seen that there is plenty of scope for new problems to arise and ample opportunity for something new under the sun. But the simile of the little boy fresh from school and his great, big brother will stand. Canada has had comparatively little experience in telephone development; and its big brother in the Independent movement, the United States, has had a great deal. But this discrepancy, like youth itself, will speedily rectify itself as time goes on. The little boy will grow—in a very few years will be just as tall and lusty as his brother. In fact, the question is whether Canada has not really moved ahead along the road of Independent telephones more quickly than the United States did in the equivalent period of its history. At any rate, if this is scarcely the case at present, we are going to make it so in the immediate future. The kindergarten era has already passed, and every step forward now will be from one standard class to the next higher. However, this is a matter in which I know full well there will be no jealousy. You telephone men of the United States will be just as well pleased with the phenomenal growth of the Independent movement in your northern neighbor as though it were happening in one of your own states. Our interests are all identical. We have both fought, are both fighting, the same enemy, the same monopoly. The Bell Telephone Company of Canada and the American Telephone and Telegraph Company are practically one and the same thing. Their objects are identical, and to attain them they fight in the same old crooked way in both countries. An Independent victory in Indiana, or in Ohio, or in Chicago, is the same as an Independent victory in Toronto, or Quebec, or Ontario, and it quickens the pulse equally in all these places. We in Canada need lots of apparatus and supplies for our Independent companies. And those of you gentlemen who are manufacturers know that you yourselves manufacture for our operators as well as for your own. The Independent movement in the United States and Canada means brotherhood for the whole continent. Your triumphs and setbacks are ours, and ours are yours.

Before dwelling on the subject proper of this paper, let me give you a brief resume of the conditions which have prevailed in the Dominion of Canada up to the present time. Up to a few years ago our population increased but slowly; in fact, frankly as to our friends, we will acknowledge that progress, as regards population and other material data of the forward movement, was rather disappointingly slow. Slow, that is to say, in the face of the marvelous potentialities which we all knew existed in the way of natural resources. These resources of the soil, the forest, the mine, and the sea, were, perhaps, greater even than your own, if they were only developed. But such development, as I have said, was slow. The truth is, you had the start of us, though nobody in Canada bears any grudge against you because of that. You got away from the starting post first, and you held the advantage. Emigrants from the old land, from Europe, from every nation on earth, came your way. Not only this, besides attracting to your own shores nearly all the new comers from other countries, you took some of the most energetic of our own Canadian sons, thus shortening our candle at both ends at once. It was the case of the snowball that began rolling; the further it rolled and the more snow it gathered, the more it would gather. Size attracts size. But this has all changed now. I don't want to weary you with statistics, but will merely say that the wonderful prosperity of the United States during the last few years has been duplicated to the full, has been bettered, in Canada. Population has made great strides; immigrants have come in at the rate of a quarter of a million or more per year. And these include many of your own best farmers, who find in our northwest better and more productive land at $10 and $20 per acre than they are leaving in their old homes at five and ten times that price. In exchanging for Canada they find similar conditions. As good or better laws, neighbors of the same stock as themselves, good climate, and every condition of an advanced civilization, except, perhaps, a one to ten ratio of telephones and this is a deficiency which is speedily being rectified.

The Bell Company of Canada was organized under the management of C. F. Sise about the year 1880. Since then, that corporation has expended something like $10,000,000 in telephone development in the dominion, though, strangely enough, a year or two ago it came to the conclusion that it needed $50,000,000 more to put into the business. This sum, after a little difficulty, they succeeded in gaining authority to obtain from the public, by issues of stock and bonds. It may be noted, however, that since this authorization the Bell company has done somewhat less new development work even than before, and many of its hands, even old employes, have been discharged, the supposition being that, what with talk of government ownership, the spread of Independent companies, and the corporation's unpopularity with the public, through the awakening influence of government inquiries into its rates and methods, it felt its feeble fires of enterprise rapidly turning into dead ashes.

Let us turn back a moment from the immediate past and present, and see what our friends, the Bell, did for Canada after twenty-five years labor and while they were still a monopoly. Let us glance a moment at their record as regards the ratio of telephones to population in places where they operate exchanges. The figures were given before the government commission on telephones at Ottawa two or three years ago.

Number of inhabitants to one telephone in exchanges operated by the Bell Telephone Company of Canada:

1 exchange has over 2,000 inhabitants to one telephone.
8 exchanges have over 1,000 inhabitants to one telephone.
11 exchanges have 750 to 1,000 inhabitants to one telephone.
11 exchanges have 500 to 750 inhabitants to one telephone.
6 exchanges have 400 to 500 inhabitants to one telephone.

14 exchanges have 300 to 400 inhabitants to one telephone.
19 exchanges have 200 to 300 inhabitants to one telephone.
49 exchanges have 100 to 200 inhabitants to one telephone.
23 exchanges have 75 to 100 inhabitants to one telephone.
53 exchanges have 50 to 75 inhabitants to one telephone.
48 exchanges have 40 to 50 inhabitants to one telephone.
66 exchanges have 30 to 40 inhabitants to one telephone.
43 exchanges have 25 to 30 inhabitants to one telephone.
38 exchanges have 20 to 25 inhabitants to one telephone.
61 exchanges have under 20 inhabitants to one telephone.

The number of inhabitants was based on the census returns of 1901. Since that time the population of Canadian towns has increased greatly—the Bell telephone development not so greatly; so that the ratio, if struck now, would in all probability show up in a considerable worse light.

Putting these figures alongside those relating to your own towns and cities, where the Independent movement made headway, the comparison is ridiculous. And when we come to rural sections of Canada, the showing made by the Bell is really a disgrace—considered either from the view of a public corporation's duty to the public or from the view of the changes for profit to its shareholders, which it has so flagrantly missed. Ohio and Illinois have one Independent telephone to every sixteen of their inhabitants; Indiana has one to every twelve, while in the whole of the United States the proportion is estimated at one to twenty. Just think of this and then look at the Bell's record in rural Canada one telephone to every 1,250 inhabitants! Is not that enough to stagger anyone not accustomed to the big figures presented by monopoly? The Bell company has always—until recently—despised the tiller of the soil. If it had the sense to know it, it is precisely the tiller of the soil, the farmer, and the country dweller, who continuously pump red blood either into a corporation or a generation. If the Bell had only kept its feet firmly implanted in Canadian soil, its position today would have been twice as strong as it is. But its opportunity has now gone. Once despised, the farmer who wanted a Bell telephone, now wants his own instead. The Bell company is making all sorts of offers to remedy its old mistake; wants the farmer to connect at dirt cheap price; wants him to buy Bell apparatus; goes down almost on its knees to him. But it is of no use. The country people have learned their lesson. If they want satisfaction in their telephone service—which they do—they don't go to the Bell. They act themselves, on their own account. And will anyone be rash enough to say there is not work enough and in plenty for the Independents to do in the dominion? Considering it is less than three years since the Independent movement started in Canada in earnest, it has done wonders. But it is a mere drop in the bucket when placed alongside what can, and should, and must be done during the three years just ahead of us. Roughly speaking, the number of Independent companies in Canada has increased by about fifty per cent each year since the inauguration of the movement. This is well so far as it goes. But there is no reason on earth why the Province of Ontario should not have just as many telephones to the square mile as, say, the state of Indiana. Conditions are just as good; the density of population about the same; the intelligence and enterprise of its inhabitants by no means inferior.

Why, then, are we the Canadian Independents unable to show similarly splendid results? And what are our immediate requirements? In the first place we are not so far advanced as you in the Independent telephone movement, simply because, for one thing, we started later. In fact, we have only now got started. I believe that, when once the movement obtains its full impetus, it will carry us forward at a rate even more phenomenally rapid and irresistible than your own. As to our requirements briefly stated, they may be summed up in the word, education. In a general way, our people know that as a provider of telephone facilities at a cheap rate, the Bell company is a failure. But enough of them do not yet know how easy it is to rectify this shortcoming, by the formation of small companies, owned, operated and managed locally. So much for the general requirements in the country districts. But there is another matter of a more serious nature which has, preforce, to be touched on; and in touching on this we place our finger upon what is the Bell's strongest point in Canada today, and at the same time I believe on the greatest need of the Independent movement. I refer to the fact that the Bell company holds franchises in many of the chief towns and cities, and that this is a reason for the non-formation of dozens and hundreds of telephone systems among the communities surrounding those towns. Take the case of Toronto Now, the Bell company has not an exclusive franchise from that city, but the way it has manipulated its privileges is almost equivalent to the possession of such. Yet there is no real reason why that part of Ontario should be tied up by the Bell. That company has been keen enough to recognize that anything like high rates or the usual atrocious service would be instantly visited on their heads by the loss of a most valued stronghold. And so it has taken care to keep rates fairly reasonable. If a competitive system, however, were established in Toronto, it would open the door to a development of outside Independent companies such as would startle even the rushing telephone states of Ohio, Illinois and Indiana. This is the greatest requirement, the strongest need of the Independent telephone movement in Canada today—the storming of Toronto and a few other Bell centers, and there is no reason to believe that the storming would not succeed. Toronto very nearly gave a franchise to a competitive Independent system three or four years ago, in spite of all the efforts of the Bell. Since that time, I venture to say, public appreciation of the Bell has not increased one iota. Knowledge is fuller, and with knowledge of the Bell came many other things.

Another requirement is for Independent long distance connection, though as Independent companies multiply, this is a need which may right itself in time. As in the United States, the Canadian Bell talks the long distance argument threadbare. Ninety-seven per cent of the telephone messages of the country probably are local messages anyway, and it is just as easy for a Bell non-subscriber to pay his quarter, or his dollar, or whatever the toll may be, as though he were a Bell subscriber. It will certainly be admitted that it is scarcely worth while putting up with the Bell and all its exasperation just for the sake of the remaining three per cent of long distance messages. Still, if we in Canada had an Independent long distance toll line it would help matters greatly. In fact, the Bell has scored many a petty triumph over this point. The Bell comes along when the Independent line has been installed and (for a comparatively small sum nowadays) offers connections with its lines. Generally speaking, our Independent men have sufficient knowledge and backbone to refuse to have anything to do with their ancient enemy. But occasionally the bait takes. It may be in order here to make a suggestion to manufacturers. As often as not, it is a salesman for one of the manufacturers of telephone equipment who is first in the field whenever talk is heard of organizating a local company. His advice is deferred to, and he is looked on as an authority in all telephone matters. I think that if he will always impress more strongly upon his rural patrons the absolute necessity of keeping quite clear of the Bell, both now and in the future, and in face of every possible argument that may be brought to bear in favor of Bell connection, he will be doing a very great deal for the Independent movement and incidentally will be acting strictly in line with his own future pecuniary interests and with those of the house he represents. I am aware, of course, that those who go out on the road to sell Independent apparatus are usually pretty keen, clear sighted men, and that they usually adopt the above course. But, occasionally, in the rush for

business and the succeeding rush for the next in sight, one will become a little careless, sell a few goods, and then let Mr. Rural Independent take care of himself.

In one feature we in Canada may claim to be away ahead of our Independent telephone brethren in the United States. I refer to the system of public ownership. If anyone tells you municipal ownership of telephones has been a failure in Canada, you have the authority of the facts to answer that he does not know what he is talking about. If any citizen should try to be elected member of the council of Fort William or Port Arthur on any other platform than the continuance of the present system of municipal ownership of telephones, he would have less chance of getting in than the rich man is said to have of being admitted to heaven. Personally, I believe the method of running a telephone system by private local enterprise is one which it is hard to beat; and that when a government enters into the game it is apt to run into snares. Nevertheless, there is something inspiring in a province like Manitoba rushing the Bell out at one great scoop and establishing a people's system. And when it is remembered that two other adjoining provinces are sailing along the same track, I think Canadians may well feel proud of the wholesale way we do things. A government-owned long distance line in other parts of the dominion would work wonders for an extra speedy development of Independent telephones; and, at least one provincial government in eastern Canada is cogitating over such a scheme.

In conclusion I will say, in the words of Francis Dagger with whom no doubt, many of you are acquainted as the foremost telephone expert in the dominion, that there is an immediate need in Canada for half a million telephones. This is a "requirement" which, together with the one or two others briefly touched upon above, I trust to see filled as rapidly as possible. With this hope and with the best of wishes from our side of the border to yours, I will now close.

KANSAS CITY'S FIRST TELEPHONES.

KANSAS CITY claims that it had the first telephone exchange established west of the Mississippi. It was in 1877 that the city on the Kaw got its first telephone. Lee D. Stanley, chief operator for the Associated Press at Indianapolis, built Kansas City's first exchange, and tells this story of his experience:

"It was in the summer of 1877," he said, "while I was employed by the Western Union Telegraph Company as night manager of its Kansas City office, that I first became acquainted with the new and untried invention called the telephone. Colonel L. C. Baker, superintendent of the Western Union Telegraph Company, came over to Kansas City one day during that summer, and in conversation with me mentioned that his friend, Mr. Durant, had just begun to canvass St. Louis with a view to installing a telephone system. How would I like to take a little time from office duties and see what I could do toward establishing the service in Kansas City, the colonel wanted to know. I informed him I was the man he was looking for, as I always was ready to investigate something new in the line of electricity, that being my hobby. Coloney Baker had with him a lot of pamphlets, diagrams and cuts of a telephone, which he wished me to study and afterward to try my hand as a canvasser. If I could secure twenty subscribers, he said he would send me the wire, instruments and equipment. The linemen then in the employ of the Western Union could, he decided, with a little assistance string the wires, all that would be needed for some time to come.

"I studied the thing thoroughly, and then started out to convince the natives that telephones were just what they needed the most. My first efforts were directed at the elevator men, and six of them agreed to have instruments installed. They gave their orders with the distinct understanding, however, that the thing would talk, and do almost everything under the sun but eat and drink. I promised of course. Then I began a tour of the packing houses. Armour & Co., Jacob Dold and Fowler Brothers agreed to take telephones. Like the others, they insisted that the instrument do all I said it would—that is, that they actually could hear and be heard through it.

"That made me nine in all, and my prospects began to look good to me. Then I tackled the wholesale grocery men as my next prospective victims, but this was the hardest part of my task thus far. They were busy men, that being a lively year for their trade. Finally I succeeded in rounding up three or four of them, but they flatly refused to sign the contract unless I could get Mr. Nathan Frank, another wholesale grocer, to go in with them. What could I do with Mr. Frank? He had repeatedly told me that he did not want the telephone, that he would not have it, that his answer was final and that he did not want to be bothered any more. But of course I could not let a thing like that discourage me. Visiting his office one day I saw him very busy with a traveling man looking at samples of coffee. It was a warm day and I was tired and thirsty. I walked boldly into Mr. Frank's office and took a drink of water from the water jar. Turning to Mr. Frank and the young drummer, I said I was very sorry I could not 'talk telephone' to him that day, as it was too warm, and that besides it might not be convenient for him just then to consider a proposition.

"Mr. Frank sprang up, glared at me and then measured the distance to the door. What might have happened I do not know, but Mr. Coffee Salesman saved the day for me.

"'What's that?' he asked. 'A telephone? Say, we just had one put in in our New York office, and it is a daisy.'

"'Did you say your people were using the telephone?' demanded Frank, in surprise.

"'That's just what they are,' assented the drummer. 'They think a whole lot of it, too. It is a great convenience, and will revolutionize business methods in a short time. At least, that is what the old man says, and I suppose he knows.'

"That was enough for the stubborn Kansas City grocer.

"'Young man,' he said to me in an impressive manner, 'go right ahead and put in your trap. Put in one, two, or three, or half a dozen—string them all over the place. Do it quickly, though, and get out after it right now.'

"I 'got after it,' and the stringing of wires began. We had the system working in a short time.

"The first telephone exchange was in a room eight by ten, boarded off in one corner of the Western Union operating room.

"When we had connected up about a dozen subscribers we announced that we would connect the telephones on a certain evening with the Kansas Institute for the Blind, and that Colonel Miller, superintendent of the institute, would have the pupils 'sing into the telephone.' We advised all who had telephones to look out for a real treat.

"We coupled on the blind institute by using an old government telegraph wire between Kansas City and Leavenworth, which ran through Wyandotte and out by the institution. The concert was a memorable event in both Kansas City and Wyandotte. Every place that had a telephone, even the offices in the packing houses, had its score of visitors. The Kansas City society bunch was out in full force. When the blind pupils began to sing, and their voices were heard distinctly at all the various points on the circuit, the people were almost persuaded that they had witnessed a miracle."

An Interstate (Independent) telephone connected with the main line at the First Baptist church of Elgin, Illinois, has been placed in the home of Mrs. Essie Tuttle, an invalid residing at 560 North Spring street, in that city, in order that she may hear the services every Sunday.

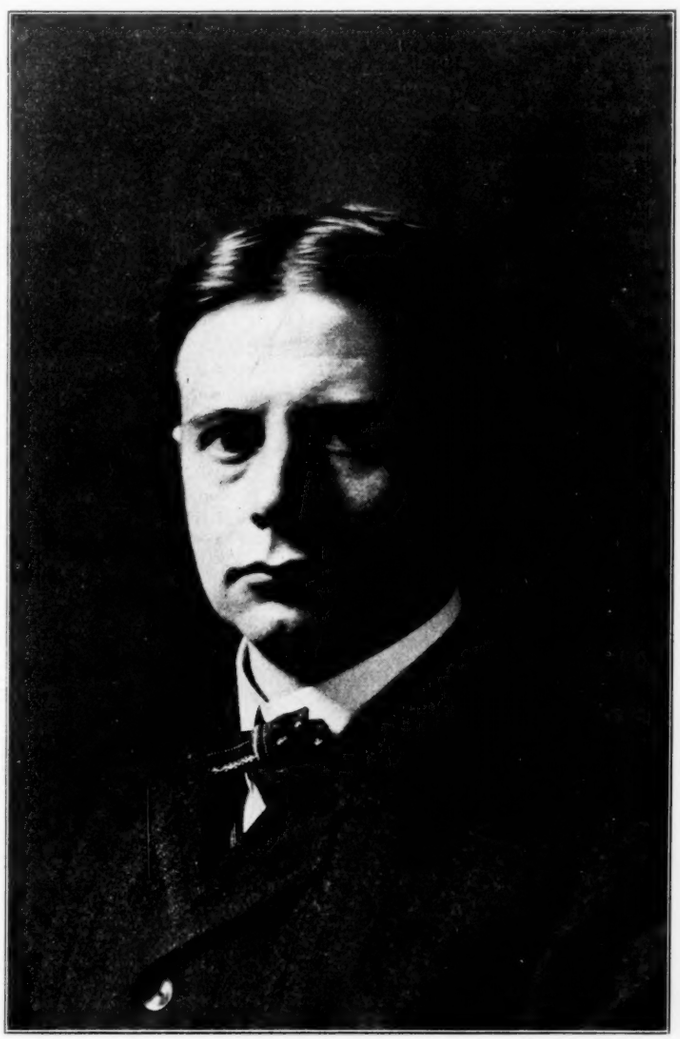
CONCERNING PANICS

A Monograph, on the Financial Situation, with a Moral which Should Be Heeded.

By Frank G. Jones

WHAT a strange thing it is that children like ghosts stories best at night! The wind whistling round the corners of the house; the limbs of the trees groaning against each other in the yard; the creaking of a distant door, people the emptiness of darkness with a thousand dreads. The children clustered by the fire, are shudderingly affrighted by any sound and sit with blanched faces, yet with eager eyes and ears, watching the lips of the one who tells the story of a ghost. Then they creep off to bed and pull the covers over their heads and shiver with the fright of what they cannot hear or see.

And we are like the children. After our long, bright happy day of prosperous times, the twilight of depression came and then the darker hours when we grew afraid. Unheeding of the stars that laugh at us in their promise of a glorious to-morrow, we hover about the fireplace trying to warm our shivering souls with the embers of yesterday, and chills meanwhile creep up and down our spines.



Frank G. Jones.

Our dread lends sight and sound to our imagination. The grisly shape of fear clanks toward our door, rattling the chains of poverty and want. And we sit shuddering while from dry tongue and trembling lips one tells the story of ghostly panics of the past. Then we, too, like the children, creep away to bed and each heedless of the rest pulls the covers of selfishness about him, and with staring eyes lies helpless in the darkness which his own cowardice has made.

Presently, while we yet lie shivering in our beds of fear, a moonbeam will glisten on the windowpane, and gradually its rays will spread until the room is filled with the soft, cool radiance of the Queen of Night. Outside the wind will die away and the leaves rustle together dreamily. That peace of night, the blessed relief from the bright glare of day, will sink into our souls and the ghosts give place to fairies who beckon us to rest. Over all the world the spirit of Omnipotence will keep guard until the morning's sunrise shall call us to the labors and rewards of another and more resplendent day.

It is not good for man to draw too deeply on his strength. We are not gods that we should think ourselves immortal; we have tired under the burdens of yesterday. We were dazzled by the glorious intoxication of the sunlight and we outwore our strength. So long as the day lasted, our hurrying feet pressed ever more eagerly in mad pursuit of our desires. We did not heed the warning of the waning hours and darkness caught us unprepared.

Our nerves are overwrought with the strain of striving and our senses are numbed by our disappointment that it could not always be day. And so we have been sitting in the darkness here and telling each other ghost stories that have frightened us. How foolish we have been!

Following the prosperous working days, must come the quiet of the night of rest. That Providence which placed a limit on our human strength, provided also for its replenishment by drawing over our feverish days the curtain of night's peace. It is our fault, if like the children, we permit our fears to rob us of our needed rest by bringing to us ghostly panic as our guest; instead of a renewal of our strength for the labors of that to-morrow whose early radiance even now is crimsoning the east.

That man who looks upon his yesterday as the *ultima thule* of attainable desire is even more supine than he who rests his oars and drifts content upon the current of to-day. The man who wins is he who sees his goal in ever receding to-morrow; the man who, whatever he may accomplish else, never will attain the end of labor until labor's end. To such a man the inevitableness of the coming day will illumine the darkest hours of night; and wisely in the hour of rest, he will conserve and renew his strength; not waste it in useless laments for yesterday.

There will dawn upon us, in fact there now is dawning, another day more glorious than our brightest yesterday. Prosperity shall tender us her cup and we shall drink more deeply its delights than ever we have done before. And brave men will drink more wisely, when they have rested.

A Fight With an Octopus

By Paul Latzke

The Story of the Bell Company's Rise to a Power that was second only to that of the Standard Oil Company—The Betrayal of Friends and Associates, The Sacrifice of Great National Characters and the Desperate Purpose of a Fight that was Carried Straight into the White House.

A FOREWORD.

[This story should appeal especially to those who have good, red American blood in their veins. It is the story of a magnificent fight that was won against overwhelming odds. It is the story of a smug coterie of "Boston gentlemen" of the immaculate type, put to flight by a few sturdy men out of the west. It is the story of a low, scheming campaign of greed, that was turned into a rout by a fine, sentimental, American citizenship. It is a story full of dramatic interest, not because of the manner of telling, which is simple and commonplace enough, but because of the facts it relates.

It is the story of at least one trust that was "busted." It is a story that, while dealing with the details of an industrial war, will interest even the women, for it is full of good, clean, honest fighting, of the deeds of men who stood shoulder to shoulder under the Stars and Stripes, and, in the name of American freedom and independence, lined up against the most complete and relentless and successful monopoly of the times—and beat it to a pulp. It is a poor sort either of man or woman who cannot find somewhere in the record of these fighters the story of a deed that will stir the pulse.—THE AUTHOR.]

CHAPTER V.

BELL AND THE REIS TELEPHONE.

THE Reis telephone was first brought to America by Dr. Philip H. Vanderwyde and exhibited by him before the Polytechnic Association of the American Institute, at Cooper Union, New York, in 1868. This exhibition aroused the liveliest scientific interest, and not long afterwards, the Smithsonian Institute at Washington, secured an example for permanent exhibition. Here it fell under Bell's observation in a most interesting way. He had been experimenting for some time with a view to perfecting a harmonic or multiple-telegraph apparatus designed to transmit several messages at once over the same wire. While pursuing this line of work, about 1874, he came across Bourseul's publication in "l'Illustration." Young, imaginative, and ambitious, the idea of speech-transmission by electricity immediately took hold of him,—and he was started on the work that ultimately brought not alone the commercial telephone, but also fastened "a gouging monopoly" on the necks of the American people; but, for a time, it looked as if the chain of circumstances would stop here. Bell was poor, barely able to keep his head above water. His condition at that time was described, ten years later, with dramatic coloring, by J. J. Storrow, the chief counsel for the American Bell Telephone Company, before the United States supreme court:—

"He was in great trouble financially and in some other ways. He pawned his watch and borrowed of his friends, and was heartbroken for other reasons. He was in no condition to go into elaborate experimenting."

In these circumstances Bell's ardor for electrical speech-transmission soon cooled, and he went back again to his main work on the multiple-telegraph apparatus, work in which he had the moral and financial support of his father-in-law, Gardiner G. Hubbard. But the idea was there, and his determination was revived by an interview with Professor Joseph Henry, of the Smithsonian Institute. Bell had gone to Washington for data for his telegraph work, and called on Professor Henry as an authority on the subject. The incidents that followed, leading him back, in the end, to the telephone, are partly set forth in a most interesting letter that Bell wrote to his parents concerning this interview.

"I felt so much encouraged by his (Henry's) interest," he told them, "that I determined to ask his advice about the apparatus I have designed for the transmission of the human voice by telegraph. I explained the idea, and said, 'What would you advise me to do; publish it and let others work it out, or attempt to solve the problem myself?' He said that he thought it was the germ of a great invention, and advised me to work at it myself instead of publishing it. I said that I recognized the fact that there were mechanical difficulties in the way that rendered the plan impracticable at the present time. I added that I felt that I had not the electrical knowledge necessary to overcome the difficulties. His laconic answer was, 'Get it.'

"I cannot tell you how much those two words have encouraged me. I live too much in an atmosphere of discouragement for scientific pursuits. Good ——— is unfortunately one of the *cui bono* people, and is too much in the habit of looking at the dark side of things. Such a chimerical idea as telegraphing vocal sounds would, indeed, to most minds, seem scarcely feasible enough to spend time in working over. I believe, however, that it is feasible, and that I have got the clue to the solution of the problem."

The "clue to the solution of the problem" was undoubtedly contained in the Reis telephone, which Professor Henry showed to the young inventor and explained in detail. It fired anew his ambition to go into the subject of "transmitting the human voice by telegraph." Unfortunately, his enthusiasm was again dampened. "Good ———" was Mr. Hubbard. This gentleman, being in the business, could appreciate the wisdom of devoting time and money to experiments that might lead to making one telegraph line do the work of three or four. But, naturally, "such a chimerical idea as telegraphing vocal sounds" would not appeal to him. So Bell went back, with his assistant, Watson, to his harmonic telegraph. But again fate intervened.

On the afternoon of June 2, 1875, three months after his talk with Professor Henry, Bell was experimenting with two springs or reeds which were vibrated in front of an electro-magnet. It was humdrum, commonplace work enough. The surroundings were as commonplace as the work,—a bare room only half lighted, a network of wires,

and all sorts of oily scraps and tools lying about in disorder. Both Bell and Watson were dirty and tired and half discouraged. It was the last scene in the world in which to expect "the birth of the speaking telephone" and the beginning of an enterprise that was to girdle the earth, making out of its magic, hundreds of millions for men who, until then, had barely earned their salt; an enterprise that was to keep the greatest judges and lawyers in the land busy for years, and eat up over $5,000,000 in legal fees.

Yet, for all the commonplace setting, it was a titanic moment; and, to intensify its dramatic interest, it was precipitated by an accident. Watson, in passing one of the reeds, chanced to strike it with his hand. The other reed responded, vibrating in unison with the first and giving out a faint humming sound. Instantly Bell was all attention. The ordinary man would have passed the incident by. The trained inventor saw in it an important phenomenon. The reed was struck again, and it responded again. For two hours the experiment was continued under all sorts of varying conditions, but with unvarying success. Then Bell plunged headlong into the matter, nor would he be again diverted. He caused his first telephone to be built. It would not talk, but still he hung to it. On February 14 of the following year, 1876, he filed his application for a patent. There was not then in existence a Bell telephone that would talk, but his patent was granted, nevertheless. His opponents afterwards alleged that this patent was granted improperly, as he patented a principle, or theory, and not the mechanical device for its application. They alleged, also, that the patent never would have been granted except for the peculiar influence possessed by Bell's Washington attorney, Pollock, who "had the underground railroad leading to Examiner Wilber's room in the patent office," and who had served Bell in the matter of his multiple-telegraph inventions. The patent was frequently attacked, on the ground that Bell had nothing to patent but a process when he was given his papers, but the courts always sustained his claims. The question was squarely met, on the final argument before the supreme court, by Bell's counsel, Mr. Storrow, who declared: "If Bell had died the moment after he wrote the specification, without even trying the experiment again, and that specification had gone to the world as a publication, the world would have had a speaking telephone. It would have had a rule by which to make all speaking telephones. No one, after such a publication, could ever have taken a patent as the first inventor of the speaking telephone."

Mr. Storrow admitted that the Bell instruments as they stood at the time of the patent, "never yielded an intelligible word," but "so firmly was the inventor impressed with the soundness of his theory that he determined to run the risk of taking out a patent on the process." Here was another link in the remarkable chain of circumstances that led Bell to fame and fortune. Had he not felt certain of his theories,—had he waited before applying for a patent until he actually perfected an instrument that would operate.—Elisha Gray would be known today as "the father of the telephone," and Professor Bell's reputation would probably be confined to a small circle as the exponent of an advanced method of teaching the deaf and dumb. Never did fate play a stranger prank; for on the same day that Bell's application came into the patent office, there came also a *caveat* from Elisha Gray, of Chicago. A *caveat* is an instrument giving public notice that the applicant is at work on an invention which he has not yet perfected, and is fully as protective, under the law, as an application for a patent.

"It is the object of my invention," declared Gray, in his *caveat*, "to transmit the tones of the human voice through a telegraphic circuit, and reproduce them at the receiving end of the line, so that actual conversations can be carried on by persons at long distances apart.

"To attain the objects of my invention, I devised an instrument capable of vibrating responsively to all the tones of the human voice, and by which they are rendered audible.

"In the accompanying drawings I have shown an apparatus embodying my improvements in the best way now known to me, but I contemplate various other applications, and also changes in the details of construction of the apparatus, some of which would obviously suggest themselves to a skillful electrician, or to a person versed in the science of acoustics, on seeing this application."

Here was the same thing as Bell's, though the form was different. If anything, Gray's *caveat* was more specific than Bell's application, for it spoke distinctly of "actual conversations" to be "carried on by persons at long distances apart." Bell's broadest claim, number five in the application, a claim afterwards made famous throughout the world because of its legal completeness, set forth that the inventor held all right to any "apparatus for transmitting vocal or other sounds telegraphically, as herein described, by causing electrical undulations similar in form to the vibrations of air accompanying the said vocal or other sounds, substantially as set forth." It was on this claim that all subsequent inventors who tried to perfect a telephone along lines other than Bell's, came to grief. The courts invariably held that it covered every form of speech-transmission by electricity. Bell's friends and attorneys declared from first to last, that every word in this claim was the inventor's own, that he had drawn the patent in its entirety, and that there had been practically no change in his draught. There is another story, however, to the effect that Marcellus Bailey, the most adroit patent lawyer of this or any other time, drew the claim. Bailey, this story declares, was given the commission to graft on to the patent specification, as Bell had prepared it, a claim that should bar all other inventions for speech-transmission. He retired into the Adirondack wilderness and nothing was heard of him for two weeks. Then he reappeared with this five-line claim, for which he was paid a fee of $5,000. Professor Bell has met this story with the laconic statement that $5,000 fees were about as plentiful in those early, struggling days, as snowballs in July.

However that may be, and no matter who drew claim number five, the simultaneous appearance in the patent office of the Bell application and the Gray *caveat* precipitated a conflict that has not yet been satisfactorily settled, although Professor Gray is dead and Professor Bell has retired from the telephone business, holding, as he has publicly declared, only one share of Bell Telephone Company stock. The Bell people claimed priority, because they could prove by Wilber, the examiner, that their paper had reached the patent office early in the morning of February 14, and was entered first in the records. The Gray answer to this was that the very fact that Bell's application appeared on the books ahead of Gray's proved that Gray's had arrived in the office first. They showed that all such papers, applications and *caveats* alike, were speared on a spindle as fast as they were received. This would leave the papers to arrive first nearest the bottom of the spindle; but, on entering for record, the papers nearest the top were necessarily taken off first, so that the first paper to be speared on the spindle would appear last on the book of record.

The controversy on this point waged furiously for years, in and out of court; but, when the final hearing was had on the Bell patents, its significance was blotted out in a most sensational manner by Lysander Hill. To the amazement of the court, the lawyers on the other side, and the world at large, Mr. Hill, in the midst of his argument, suddenly waived aside the question of priority as to the hour of filing, and injected, instead, a far graver question. He declared that Bell's attorneys, Pollock and Bailey, had deliberately stolen out of Gray's *caveat* the most important claim, that covering a liquid battery transmitter. Mr. Hill

produced a copy of Mr. Bell's specifications for his English patents, sent abroad on January 25, 1876, less than three weeks before the American application was filed. These showed no reference whatever to any form of transmitter, except a magneto-transmitter, an amplification, in fact, of the original apparatus, in which Mr. Bell worked entirely with electro-magnets.

"How did the liquid transmitter suddenly appear, full blown, in the American patent?" demanded Mr. Hill. Then he proceeded at great length, and with much circumstantial detail, to make out his charge. In effect, he said that, thanks to their "underground railroad," Pollock and Bailey were notified by Examiner Wilber of the Gray *caveat*, a supposedly secret document, immediately upon its filing. When they found, upon examining it, that it contained a liquid-transmitter claim, they appropriated this idea for their own. The Bell application, according to Mr. Hill, was surreptitiously withdrawn the next day, altered by Mr. Pollock, or under his direction, so as to cover the liquid, as well as the magneto-transmitter, and then returned to the patent office files. A careful reading of all the facts presented by Mr. Hill certainly makes a startling presentation; but the attorneys on the other side met the allegations with equally strong proof the other way, and the court, after carefully reviewing the allegations, declared:

"We, therefore, have no hesitation in rejecting the argument."

The question was never tried in court. Gray, in after years, tried to bring it before a jury, but failed. Had he succeeded and made good his charges, the destiny of the telephone industry might still have been changed, for the liquid transmitter was as distinct from the magneto-transmitter as was the latter from the method used by Reis. The liquid transmitter embodied the principle now in general use, a continuous current of electricity flowing over the line, the current varying only in intensity, or undulating, as it is termed, with the force and shape of the sound waves. The magneto-current, on the other hand, is a back-and-forth current, flowing first one way over the line and then the other, and produced by the vibrations of the transmitter diaphragm before the magnets under the influence of the voice. The two methods are absolutely distinct, and, had the liquid transmitter appeared in Gray's claim only, two telephone systems might have been in operation in the United States from the very start, and all the disadvantages of monopoly avoided.

CHAPTER VI.

A BATTLE OF THE GIANTS.

Even as it was, Gray's *caveat* broke the monopoly for a time. The Western Union Telegraph Company had been viewing with serious alarm the growth of the Bell Company. There was and is a natural relationship between the telegraph and the telephone business. Many of the principles involved are allied, and much of the apparatus may be used for either purpose. Today, for example, one of the important sources of revenue of the parent Bell company is the rental it receives from brokerage houses and other concerns for the use of its long-distance wires for private telegraph purposes. Apparatus has been devised by means of which it is possible to use the same line simultaneously for telegraphing and telephoning, so that, while a broker is sending his telegraph dispatches from his New York to his Chicago office, and paying the telephone company a fat rental for the privilege, the company is getting another big rental from the broker's neighbor, or, possibly, from the broker himself, for the privilege of using the same line at the same time for telephoning from New York to Chicago.

At the outset of the telephone industry, this sort of thing was not possible. But the principle was well understood, and the Western Union saw the handwriting on the wall. So the company decided to take the bull by the horns and go into the telephone business on its own account. The directors, therefore, bought up the Gray claims, and also the claims of Edison, who had invented a carbon transmitter, the claims of Page, and of half a dozen other inventors who had telephone devices of one kind or another, which generally conflicted with the Bell patents. For Edison's patent the Western Union paid $100.000. To Gray it has been variously stated the company paid from $50,000 to $100,000. Altogether the directors invested about half a million in patents, and then they started in to give the Bell a fight.

Infringement suits were brought right and left by the Boston Bell Company. But infringement suits take a long time to fight to a finish; and, if you have money enough, as the Western Union had, you may face them with much equanimity. So competing exchanges were set up by the telegraph people in New York, Chicago, St. Louis, and most of the other big centers. Rates were cut to pieces, and the millions that the Bell people had already begun to see piled up, threatened to vanish into thin air. But, as is invariably the case where it is money, and not principle, that is at stake, this battle between the two corporations was finally patched up, after it had raged most venomously for several years. As I have pointed out, the present attack on the telephone monopoly had behind it "an uprising of the people." Therefore it has continued, and will continue. The Bell-Western Union competition was merely the grabbing of two greedy groups of capitalists for the public pocket, and, as soon as it was seen that neither side would give up, a "compromise" was effected. This was made all the easier, as the Western Union, which was by far the wealthier of the two companies at that time, was advised by its own counsel that, in the end, the Bell patents would undoubtedly be sustained. Accordingly, the warring factions got together, so that they might carve up the public purse at leisure, each in its own way. The Bell company bound itself not to go into the telegraph business during the life of the patents, and the Western Union agreed to keep out of the telephone field. The Bell company also agreed to pay its rival twenty per cent of all royalties collected for the use of telephones. Finally the Western Union was to receive forty per cent of the stock of the local operating company which was to have exclusive control of the telephone field in New York, and a similar block of the stock of the Chicago Bell company.

As soon as this agreement was ratified, the competing exchanges were consolidated, and the combination turned a new and common front to the public and the "infringers." Both these unfortunate classes then got their dose in plentiful quantities to pay for the ammunition that had been spent in the fight of the giants. The public, of course, had to pay the main part. Rates were raised everywhere, until the people groaned aloud. As for the "infringers," they were haled into court in almost every district where there was a United States judge. Besides the Western Union, half a dozen other less powerful concerns had launched opposition telephone companies in various parts of the country. Like the Western Union, they were immediately sued for infringing the Bell patents. But, unlike the Western Union, they had neither the money nor the influence to force a compromise, and the Bell people proceeded against them inexorably. They drove them through court after court. Their death knell was finally rung by the supreme court decision of 1887.

As soon as this decision came down, the Bell people proceeded to stamp the life out of the last of these competitors. In a dozen states injunctions were secured and infringement damages promptly assessed. Under these judgments, telephone plant after telephone plant was ripped out, and the apparatus was piled up in the most conspicuous place that could be found and burned in a public bonfire as an

"object lesson." In St. Louis and the surrounding country, the Pan-Electric Company and other concerns had a number of active exchanges in operation. The equipment of these exchanges was piled upon the levee as high as a house, and then the torch was applied. So it was in Pittsburg and other cities. By the end of 1888, not a single plant outside of the Bell system was at work, except in two small places. In the little town of Fort Smith, Arkansas, Dr. Harrison, a practicing physician, had built up a little exchange with apparatus that he had bought in St. Louis. When the Bell lawyers went after him, he defied them and their power to close him out. When they threatened him with the instrument of the supreme court, he answered that he did not care for them or the supreme court either. He stated that he had invested his own money and the money of his neighbors in the little plant, and that he did not propose to give up his property to them without a fight.

The Bell company then turned to Judge Parker, sitting at that time in the United States court in that district, and asked him for a peremptory injunction restraining Dr. Harrison from operating his exchange, and also for a judgment for damages so that they might seize his equipment. This motion Judge Parker declined to grant. He took somewhat the same view of the situation as Dr. Harrison, and, while asserting the greatest respect for the opinion of the supreme court, he still held that he could not in justice grant a judgment that would destroy the property of his neighbors without investigating for himself the merits of the case. He therefore invited the Bell people to come before him and present their evidence to show that they had a right to receive what they asked. This proposition struck a chill to the souls of the gentlemen in Boston who controlled the destinies of the trust. It meant the reopening of the whole case, and for this they had no stomach. They had been frightened badly enough by the narrow squeak with which they had come off in Washington, and were not minded to reopen an issue which, on a retrial, might turn the tables. They therefore contented themselves with the complaisant action of the judges in the other districts, who had no such scrupulous ideas as Judge Parker.

The only other man who succeeded in escaping the Bell dragnet was J. L. Zietlow, now president of the Dakota Central Telephone Company, with headquarters at Aberdeen, South Dakota. Mr. Zietlow during all the Bell litigation managed to keep two small exchanges open in Dakota. But it is generally understood that Zietlow's case was different from Harrison's, that the Bell people tolerated him for reasons of their own. This impression has gained strength from the fact that Zietlow's company is now a Bell licensee.

CHAPTER VII.

FORGING THE CHAINS OF MONOPOLY.

In the preceding chapter I have shown how the American Bell Company came into absolute legal and moral control of the great telephone industry under warrant of the United States government and had behind it all the power of this government to enforce its monopoly.

What use did the company make of the extraordinary powers conferred by this decision? It put into final effect the most perfect and paralyzing system of monopoly ever devised.

From the moment the Bell patent had been granted, in 1876, Gardiner G. Hubbard had taken complete charge of the business end of the new industry. He had been won over to the telephone idea reluctantly, but was finally carried away by Mr. Bell's confidence and enthusiasm, and helped in putting the patents through. When this had been accomplished, he proceeded to lay out a plan of exploitation designed to insure not only a monopoly of the telephone business during the life of the patents, but a monopoly in perpetuity as well.

The appearance of the Western Union and the other "infringers" put a temporary check on Mr. Hubbard's plans. But, when these were out of the way and the field was cleared of obstructions by the supreme court, he put his ideas through without regard to public or private rights. A small output and enormous profits constituted the Hubbard subsidiary local operating companies, or individuals, under high rentals. It was to be a utility for the rich and the prosperous and those who had to have it in their business machinery, regardless of price.

The effect of this policy on the community, when it was finally enforced without restriction, was withering. Its economic cost will never be ascertained. The American Bell Company's own records show that, in 1894, when the last Bell patent expired and the present competition began, it had in operation a total of only 291,253 telephones. That is, under a complete monopoly of the business, the company had put out, in eighteen years, less than 300,000 instruments.

As against this, there were in use, on June 30, 1905, 2,547,321 complete instruments under Bell control, and, as I have already stated, something over 3,000,000 instruments under Independent control. That is, during eleven years of free competition, over 5,000,000 telephones were manufactured and put into use, as against less than 300,000 during the eighteen years of the monopoly. If the situation can be summed up in stronger terms than this, I should like to see it done.

The Independents, though they have been really active for only ten years, have brought about such a spread of the telephone service that the annual output, today, is more than twice as great as the total number of instruments in use when the monopoly lost control. A single Independent factory, at Rochester, New York, is turning out over 200,000 complete telephones a year, and is not able to keep up with its orders even at that. Compare this with the record of the trust, when, from 1885 to 1890, it installed, during the entire five years, only 50,156 new instruments, an average of about 10,000 a year.

In Indiana in 1905 the Independents were operating 165,000 telephones, or within 130,000 of the number the trust had in operation throughout the entire country in 1894, when competition began. The annual rental paid by the Indiana public for these telephones amounted to $3,048,885. The same number of telephones, at the rates charged by the Bell people before competition began, would have cost $7,275,300.

The fact is, then, that, in this one state, competition is saving the people $4,226,415 a year in direct charges,—the income, at average interest, on a fund of $100,000,000! Indirectly, the saving is multiplied enormously, for it is conceded that the telephone, today, owing to its extended use, is a tremendous economic factor, adding, in many cases, from five to fifteen per cent to the producing power of the industries of the country.

A conservative estimate has placed the direct net earning power of every telephone in use at fifty dollars per year, on the average. In other words, the five and one-half million telephones in use today are adding to the wealth of the United States at the rate of $275,000,000 a year, through the saving of time and labor and the enlargement of opportunity. What shall then be said of the selfish coterie of men who, for almost a quarter of a century, restricted this tremendous factor to the use of a favored few who still regard it as a "luxury intended only for those who can afford to pay for it." We can best get at the extent of their crime, for it was nothing else, by taking a few concrete examples of telephone work.

The continuation of Mr. Latzke's telephone story will be found in the April TELEPHONY. The next installment will be very interesting. The story may be had in book form at 25 cents per copy. Address TELEPHONY, Manhattan building, Chicago.

CONCERNING FINANCING METHODS

A Paper Prepared for the International Independent Telephone Association

By L. W. Stanton

THE shrewd financier and far sighted business man of to-day recognizes that methods of financing must be somewhat changed to meet modern conditions and to put our industries and public utilities on the most substantial basis. This fact has been fully recognized by the United States Steel Corporation, the world's greatest industrial institution, and by a number of lesser companies, especially by the public utility corporations.

The feature that they recognize more keenly than any other is the necessity of the distribution of the securities of corporations among the masses, the common people and employes. There is no feature that will so thoroughly protect a corporation against unjust laws, against socialistic principles, against municipal and government ownership advocates, and that will do as much to alleviate the troubles between capital and labor as the distribution of securities in small lots among small investors.

The United States Steel Corporation annually distributes among its employes several millions of dollars in preferred stocks, and the effect is becoming very marked. Owing to the very great importance of this matter of distributed ownership, I will call attention to some of the liberal features that the United States Steel Corporation has offered its employes and which emphasizes the importance the corporation attaches to the matter of having its employes financially interested. These features adopted by the United States Steel Corporation can be made a basis upon which other corporations may base their methods of inducements to the small stockholder. Each class of corporations will have to work out a plan to suit their individual needs. The public utility corporations, such as gas, water, telephone, etc., should interest their local consumers or users as well as their employe. This matter will be taken up later in this paper.

We will now take up the methods employed by the United States Steel Corporation that we may have a basis to work from. The Steel Corporation is very liberal with its employes in regard to the investment feature. They offer to their employes during February of each year their seven per cent preferred stock on terms which are herewith described. Employes are allowed to subscribe annually for amounts of stock in proportion to the wages they receive. The stock is paid for in small semi-monthly payments. Note this fact, "small semi-monthly payments." If an employe is sick or unable to work, or the mills are shut down, no payment on the stock is required. In case of death or total disability the company issues paid up shares for the amount paid in—that is, if the injured or deceased employe was paying on five shares and they were two-fifths paid up, there would be issued to the employe or his heirs two full paid shares. If the market price of the stock falls below the price at which the employe made the purchase and he desires to sell his holdings the company will redeem same at the price paid and, in addition, pay five per cent on the money which the employe had invested in the stock. Note this also—that the corporation pledges itself to redeem this stock at the price the employe paid for same, even if the price has dropped to half the value it was when the employe made the purchase, and, in addition, the company gives five per cent for the use of the money during the period the employe had some invested in the steel stock.

Besides the seven per cent dividend on the preferred stock the steel corporation gives its employes an additional annual dividend of five per cent and those who have been efficient employes and stock holders for five years receive yet another additional dividend which brings the annual dividends up to fifteen or sixteen per cent. The corporation recognizes that the financially interested employe is a decided factor in the economy of modern industry. The financially interested employe of the steel corporation receives regularly a financial statement of the corporation's business, which also tends to interest the employe. The employe by being financially interested not only looks on the work more as his own, but he as a trades union man will not stand for antagonistic legislation that would be detrimental to his own financial interests, and, as we are all aware, the trades unions are rapidly becoming a factor in the politics of the country. I mention these facts to show the tendency of some of our greatest corporations.

The public utility corporations, such as street railway, gas, water, telephone, etc., are beginning to recognize the tremendous advantages of local ownership in the cities in which they operate. There are no three other factors combined that so fully prevent hostile legislation and antagonism towards rates of earnings as to have the public largely interested in a financial way in your enterprise.

There is no industry or public utility in all industrial America that begins to compare with Independent telephony for having its securities distributed among the masses, the people in every walk of life. You find Independent telephone securities held not only by bankers, merchants, legislators, judges, lawyers and doctors, but also by the farmers, the mechanics, the clerks and the small investors of every calling. In the state of Ohio there are over 30,000 stockholders of Independent telephone securities, and in the state of Indiana there are more than 20,000 stockholders, and the stockholders of these two states hold more than half a hundred millions of Independent telephone securities, and in most of the other states there is about the same ratio of stockholders and holdings in proportion to the population, that there are in the two states just mentioned.

A short time ago, when one of our state legislatures was in session, there was an unsuccessful effort made to pass a bill affecting the public service corporations, and one of the members of the house remarked to the writer that it was impossible to pass that bill until the Independent telephone companies were divorced from it. He made the remark that two-thirds of the members of the legislature were either directly or indirectly interested in the Independent telephone securities.

From the foregoing we see the tremendous advantages to be derived from local ownership among the masses rather than by the classes. Some of you are asking what is the best method to pursue to obtain such results. I tell you, first, honest capitalization; second, proper management, and third, the proper presentation of facts to the investors. We have some very excellent examples of this among Independent telephone companies. One is the Tri-State Telephone Company, of Minneapolis and St. Paul. This company has something less than 3,000 local stockholders holding more than $3,000,000 worth of its stock. The greater portion of

this stock is six per cent preferred stock and is held in amounts from $10 up. Another very good example is the Columbus Citizens Telephone Company, of Columbus, Ohio, which company has sold something over three-quarters of a milion dollars worth of preferred stock to an army of small investors. The stock of these companies is held in such high esteem that during the recent financial flurry these stocks, though listed on the stock exchange, in no case sold below par. Each of these companies had a first mortgage bond issue in ahead of the preferred stock, but this did not prevent the sale of the stock, which is largely accounted for by the personnel of the officials, directors and management, who are noted for their high integrity and good business judgment. However, unless the officers of a company are very favorably known and the company on a splendid business foundation there may be some difficulty experienced in disposing of the securities. It then becomes necessary to show special inducements to investors. This is sometimes done by issuing first mortgage bonds, but these do not always appeal to the investor unless the bonds so issued have some special advantages.

We will now take up some of the special features that may be incorporated in a bond issue to make it more attractive and at the same time to be an advantage to both the investor and the corporation issuing same. First, we will take up the convertible bond, which, as its name indicates, is a bond that can be converted into another class of securities, which is usually into a stock. This conversion feature is always optional with the holder of the bond, and gives the investor the advantage of a security secured by a mortgage with the privilege of converting into a stock if he so desires. This gives the convertible bond not only a solid, substantial value due to the mortgage, but also an additional speculative value owing to the fact that the stock is liable to pay ten per cent or more. This gives the investor the advantage of an interest bearing mortgage security at the beginning, with the privilege, at his own option, of converting into a stock and participating in the increased earnings should the company make the favorable development anticipated. This class of bond has three distinct advantages to the corporation issuing same: First, the securities are sold more easily because the investor not only receives a mortgage security but has the additional chance to share in the increased earnings and prosperity of the company. Second, if the bonds are converted into stock you will have eliminated the lien or mortgage on your property. Third, you have your bondholders converted into stockholders and stockholders are always much more loyal than bondholders. Bondholders know that they will be taken care of first if there is any trouble and if there is anything left the stockholders will be taken care of. For this same reason it is preferable to have your bonds converted into the common stock of the company instead of into a preferred stock, especially if the preferred stock is preferred both as to assets and dividends. The convertible bond just described is becoming justly popular among both investors and corporations. It has been noted by a number of financial journals of late that during the depression of securities within the past few months that the convertibles have been less affected than any other class of securities. It might also be noted that convertible bonds sell at a higher price than any other bond. All other classes of bonds are retired at or near par, while the convertible bond may be converted into stock selling at 200 or more. Some of the railroad convertible bonds have sold as high as 180 and 200. This is a feature that should interest the investor.

Another form of bond which has been issued by some leading corporations is a participating bond. This form of bond has some of the advantages possessed by the convertible bond and also shares some advantages. The advantages are that the holder does not have to give up the lien on the property to participate in the increased earnings. On the other hand, his bond can never rise to the high price attained by convertible bonds owing to the fact that the bond may be retired on any interest bearing period by the corporation issuing same by paying a small premium. The corporation receives the advantages of: First, easier sale of the bonds. Second, it can retire the bonds by paying a small premium. Third, the participating feature gives the bondholder an interest in the welfare of the stockholder, for if the company shows high earnings the participating bond shares in the profits after the bonds and stocks have each received five per cent, or whatever per cent is specified.

Another feature that tends to strengthen the value of a corporation's securities and to make the sale of the bonds less difficult is a retiring fund. This retiring fund is sometimes specified in the mortgage which secures the bonds and specifies that a certain per cent, we will say six per cent, of the gross income, be set aside each year to retire the bonds. It should also be specified in the mortgage that the bonds to be retired each year be retired at a premium, that is, the bonds to be retired the second year to be retired at par, those retired the third year at 101, those retired the fourth year at 102, and so on till the tenth year, when they will be retired at 108. In case there are no bonds offered at the premium specified for any particular year, then there are a sufficient number of bonds drawn by lot from bondholders to equal the fund set aside for retiring the bonds. The premium just mentioned tends to stimulate the price of the securities of the corporation issuing the bonds and especially is this true of the bonds themselves. This retiring feature also takes care of the depreciation of the plant to a certain extent. Another feature is that each bond issue should contain a limiting clause, limiting the amount of bonds that may be issued. This clause, of course, is put in as a protection to the investor and to stimulate the sale of your bonds. In case of a telephone company this limit may be stated at some definite figure, we will say, for sake of illustration, at $100 for each complete working telephone. This amount, of course, would vary with the size of the city. Then there should be an additional issue for the undeveloped capacity, say $75 for each unit of capacity. A unit of capacity would be known as each pair of wires installed but not in use. This makes it possible to issue bonds to increase your wire capacity previous to the installation of telephones themselves and at the same time gives the bondholder every security.

Another feature that is receiving the attention of corporations issuing bonds as well as bond houses and buyers, is the issuing of bonds in small denominations. One of the large New York bond houses is very much in favor of issuing bonds in denominations as low as $100 and larger. Bonds which are issued in denominations of $1,000 each are found too large to meet the requirements of the majority of the investors of the salaried class who are becoming educated to invest in bonds.

We have now outlined a number of substantial inducements that may be incorporated in bond issues that will give the small investor and savings bank depositors exceptional opportunities for investment. It now remains to interest the individual investors. We all know that if the telephone users were investors we would have the best possible combination. The following plan may be of interest to telephone men, as it combines the features just mentioned and is in actual operation in some places, with excellent results. The idea is to go to your telephone users and offer them a first mortgage bond in a denomination that just pays their telephone rental—that is, if a telephone user's rental is $15 per year sell him a $300 bond, if his rental is $30 a year sell him a $600 bond, which, at five per cent interest, just pays his telephone rental. You can show him that he can participate in all increased earnings of the company over and above five per cent. You can show him that if he has money in a savings bank which is only earning him three per cent you can earn him five per cent and possibly eight or ten per cent,

and that his telephone rental is always paid, and that he has an investment that is constantly increasing in value. You can show him that his investment is a first mortgage on the property and is absolutely secure and safe in every way. It is true you cannot get but a portion of the telephone users to invest in your bonds, you could not accommodate them all if they so desired. You could only sell to a sufficient number to pay the interest on the bonds. This would probably be about one subscriber in five. There are two other features which might be added that would appeal to the savings bank depositors. One is the purchase of securities on the installment plan. This is practically what a savings bank is, it is depositing on the installment plan. America to-day is largely on the installment plan. Ninety per cent of the American people are wage earners, that means that are drawing their salaries or wages on the installment plan, meeting their expenses and laying aside their savings on the installment plan.

Did it ever occur to you that your telephone user who pays an annual rental of $15 per year could pay to your telephone company $2.50 per week for twenty-nine and one-half months and not only pay this telephone rental during this period but at the end of this period have a $300 convertible bond to his credit, and the five per cent interest on this bond would pay his telephone rental as long as he held the bond. This can be made a very attractive proposition to the small investor. He can be shown that his weekly payments have a six per cent interest compounded semi-annually and that his telephone rental is paid during the period he was making the payments. He can be shown the gilt edge security that his bond represents and the possible increase in value of both the principal and interest. Don't tell me this is impractical, for it is practically the same thing that the United States Steel Corporation is doing—that is, selling several million dollars worth of its preferred stock each year to its employes on semi-monthly payments, which payments are made from $2 a week up. It is also practically on the same basis that the savings banks are securing hundreds of millions annually—that is, by small weekly payments from the depositors. One of the bond houses in New York is also selling bonds on the installment plan. This, at first thought, might appear to be too much trouble, but if properly handled should not add much more work, as all depositors would be expected to deposit their money with the company the same as though it were a savings bank. While there will be some additional trouble it would be well worth the trouble to have the small investor interested with you. In offering your securities to the public you should call attention to the stability and future value of telephone securities. There is no other class of securities that offer such advantages. For instance, as long as civilized man exists he will desire to communicate with his fellow man, and it is inconceivable to think of anything more simple than to lift the telephone receiver to your ear and talk, which is practically the system of to-day.

Any electro-technically trained man knows that wireless telephony for a city's commercial purposes is as utterly impractical as is perpetual motion. Therefore we will continue to use our copper wires, our lead encased cables and our conduits. As to the durability and future of these materials we have history extending backward for centuries. For example, our conduits are composed of the same kind of clay as was the pottery we find buried in the ancient cities of Babylon and Nineveh, and this pottery or hard burned clay we find unchanged by centuries of time, and we have every reason to believe that our conduit systems which are buried under the hard pavings of the street will last for centuries to come. The durability of lead and copper is well illustrated by a story told by a prominent telephone man who states that when sight seeing in Rome he saw workmen tearing down one of the old bath houses which had been built 2,000 years before, and he noticed they were taking out lead pipe which had been installed at the time the bath house was built, and upon examination he found the pipe to be as good as new, and the only difference he could discover between the pipe which was being taken from the old bath house and the new lead pipe of to-day was the manufacturer's name was stamped about every three feet. This telephone man remarked that there was no reason why, with proper precautions against electrolysis, that the lead pipe encasing his telephone wires, when protected by underground conduits, should not last for another 2,000 years. The copper used is practically the same as when it comes from Mother Earth.

From the foregoing we see that the conduits, lead and copper, which form a large per cent of the cost of a modern telephone property are practically indestructible for centuries to come. Compare these materials with the water pipes of our water companies or the gas pipes of our gas companies, or the rails of our railroads, and we find that these last mentioned materials will be mere streaks of rust while a large portion of our telephone properties will still be in an excellent state of preservation.

There is no class of securities that offers the investor so many advantages and advantages of such intrinsic value as do telephone securities.

MICHIGAN CONVENTION.

THE Michigan Independent Telephone Association will hold its eleventh annual convention at the Hotel Pontchartrain in Detroit, March 24-25, A fine programme is being prepared and the topics assigned are of vital importance to all Independent Telephone men. The committees appointed are as follows:

Committee on arrangements—W. B. Woodbury, chairman, general manager, Inter-State Long Distance Telephone Company, Detroit; W. J. Melchers, general manager, Union Telephone Company, Alma; W. S. Vivian, secretary, Michigan Independent Telephone Association, Grand Rapids.

Registration committee—A. A. Burch, chairman, manager, Citizens Telephone Company, Battle Creek; W. S. Vivian, Grand Rapids; M. A. Porter, manager, Inter-State Long Distance Telephone Company, Northville; L. L. Conn, secretary, Union Telephone Company, Alma; W. H. Swaverly, manager, Swaverly Telephone Company, Kalkaska; C. H. Rauch, manager, Plymouth Telephone Company, Plymouth; H. T. Clough, manager, Union Telephone Company, Owosso; C. H. Hood, Home Telephone Company, Detroit.

Reception committee—C. E. Tarte, chairman, general manager, Citizens Telephone Company, Grand Rapids; W. O. Hunt, vice president, Adrian Telephone Company, Adrian; W. A. Young, president, Benzie County Telephone Company, Benzonia; M. W. Briggs, general manager, Cass County Telephone Company, Dowagiac; William Robinson, manager, Citizens Telephone Company, Muskegon; H. F. Wing, secretary and general manager, Home Telephone Company, Grass Lake; W. B. Woodbury, Detroit; George T. Thorward, Home Telephone Company, South Bend, Indiana; R. C. Smith, secretary and treasurer, Homer Telephone Company, Homer; J. E. Hisey, president and general manager, Central Michigan Telephone Company, Laingsburg; Thos. Dromley, Jr., general manager, Lake Shore Telephone Company, Hart; W. H. Graves, secretary treasurer, Leslie Telephone Company, Leslie; G. S. Stout, general manager, Missaukee Telephone Company, Lake City; F. W. Gradolph, president, Monroe County Telephone Company, Dundee; W. W. Crabbs, president, Morenci Telephone Company, Morenci; J. J. Speed, general manager, Saginaw Valley Telephone Company, Saginaw; A. C. Himebaugh, president, Southern Michigan Telephone Company, Burr Oak; C. W. Swaverly, Kalkaska; W. J. Melchers, Alma; C. B. King, Ann Arbor.

Digest of Telephone Patents

By Edward E. Clement

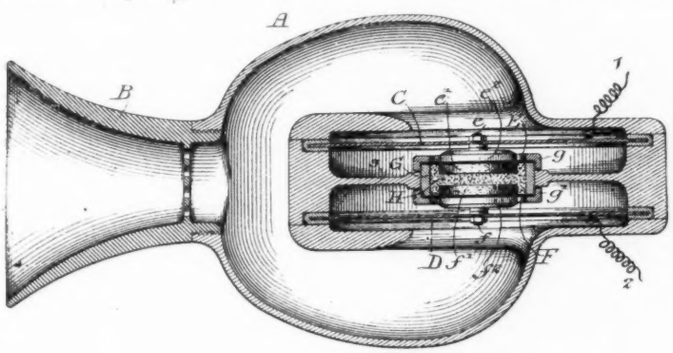
874,511. Interrupter. Kaisling. The armature of the electromagnet when practically at the end of its stroke moves an actuating member of a contact which has a movement in the same general direction as the armature itself. Patent assigned to Milo G. Kellogg.

875,081. Telephone Dictating System, or Apparatus. Kelley. A plurality of stenographers' stations, each equipped with telephone apparatus, is connected by a three-wire system to a manager's station. Separate talking circuits may be established through circuit connections joined to the blades of the keys corresponding to the respective stations. Patent assigned to the General Acoustic Company, New York.

875,138. Telephone Transmitter. Umbach. In this device the button has an angular relation to the diaphragm. A stud is provided which is bent at an angle by means of which the button is secured to the diaphragm and through the medium of which the angular relation may be adjusted. Patent assigned to the Western Electric Company.

875,151. Telephone Attachment. Case and Smith. A series of stepped index sheets is pivoted between supporting plates. The stepped ends of the sheets project beyond the plates. Patent unassigned.

875,156. Telephone Transmitter. Clausen. This transmitter consists of two main diaphragms with two supplemental diaphragms disposed between them. The supplemental diaphragms have electrode surfaces and between

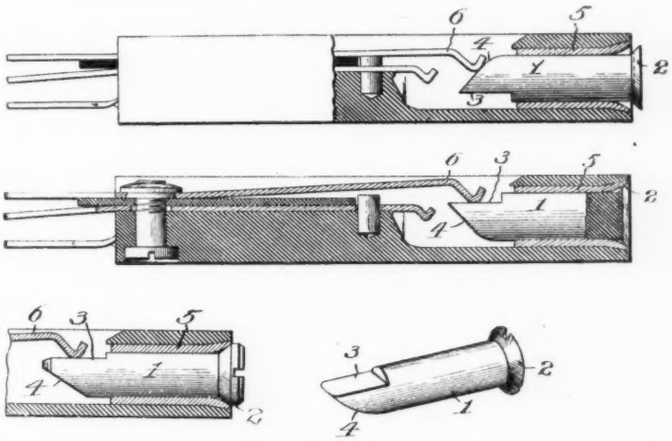


these surfaces granular carbon is interposed. Patent assigned to American Electric Telephone Company.

875,478. Telephone Directory. Weinraub. The names are carried on a strip adapted to be rolled on two rollers provided for the purpose. Between the rollers is a frame having a rectangular opening through which a name can be seen when the strip is moved from one roller onto the other. Patent unassigned.

875,951. Controlling Mechanism for Automatic Exchanges. Roberts. The selective operation of the controlling mechanism is effected by means of electrical impulses transmitted from the sub-stations over a single circuit, the controlling or impulse-transmitting mechanism at the sub-station being adapted to impart to the currents sent over the line certain peculiar characteristics to which the mechanism at the central office is selectively responsive. Patent assigned to the Western Electric Company.

875,882. Designation Plug for Telephone Switchboard. Adams. This plug is designed when inserted to be flush with the board. It is provided with a cam surface which co-



operates with the jack-spring to force the plug outwardly when the latter is rotated, so that the plug can be released. Patent assigned to the Western Electric Company.

876,400. Electrical Distributing Rack. Rolfe. This device consists of a frame having vertically and horizontally disposed strips forming sections. The sections on the front side of the rack are designed for protectors and on the rear side for terminals. Patent assigned by mesne assignments to Rolfe Electric Company, Rochester, New York.

876,434. Non-Interfering Party Line Telephone System. Brown. When a subscriber's switch-hook is in one position and the generator is rotated the circuit arrangement is such as to signal the central operator, and when the switch-hook is in another position the other subscribers on the line are signaled. Patent assigned to Kellogg Switchboard & Supply Company.

877,033. Switching Mechanism for Telephone Circuits. Andriano. This invention comprises two sets of circuit-closing contacts used in connection with a portable telephone desk set. One set operates to select the line and the other effects the completion of the talking circuit. Application filed March 15, 1905. Patent assigned to Direct Line General Telephone Company, San Francisco, California.

877,058. Telephone System. Dean. Two batteries are used in this system and current is supplied to the lines independently. Changes of potential on the line do not affect the calling subscriber, whose line is connected with one of the batteries during the process of making connection. Application filed November 11, 1903. Patent assigned to Kellogg Switchboard & Supply Company.

877,121. Telephone System. Post. The apparatus in this system is arranged so that when the operator answers

the call the connection of the battery with the calling line remains undisturbed, thereby preventing disagreeable noises. Application filed November 11, 1903. Patent assigned to Kellogg Switchboard & Supply Company.

877,727. Telephone Exchange. Norstrom. In this system the receivers at the substations may be shunted and means are provided at the central office for controlling the shunt circuit. Application filed October 4, 1901. Patent assigned by direct and mesne assignments one-third to John Anderson, one-third to M. E. Richardson and one-third to John H. Martin and H. Keating.

877,901. Lockout Device for Party-Line Telephones. Bruce. This device comprises a circuit-breaker operated by an electromagnet and a gravity switch mounted on the frame with the electromagnet and connected in the same circuit. Application filed February 15, 1906. Patent assigned by mesne assignments to the American Automatic Telephone Company.

877,902. Telephone Switch. Bruce. This device comprises a bifurcated switch lever having a circular groove. A circular flange adapted to enter the circular groove permits the engagement of the lever with a spring catch. Application filed February 18, 1907. Patent assigned by mesne assignments to the American Automatic Telephone Company.

877,921. Telephone Exchange System. Fowler. The connection of a line with the cord circuit brings the entire winding of the supervisory relay into circuit. The supervisory lamp is not illuminated until the supervisory relay is short-circuited. Application filed May 22, 1906. Patent unassigned.

877,968. Combined Telephone Drop and Jack. Thomson. A transparent guard plate is held in a grooved insulating support in front of the character upon the annunciator drop. Application filed June 7, 1907. Patent assigned to Electric Goods Manufacturing Company.

878,017. Party Line Telephone System. Poole. Relays are provided for the telephone sets at the substations and these relays may be operated through a low resistance path thereby cutting off from any other relay an energizing circuit. Application filed February 20, 1905. Patent unassigned.

878,018. Lockout Telephone System. Poole. In this system electromagnetic controlling mechanisms are used and interference by the other parties on the line is prevented when one party calls up, since the calling party has used the available energy on the line thereby rendering the controlling mechanisms at the other stations inoperative. Application filed December 30, 1905. Renewed September 27, 1907. Patent unassigned.

878,112. Electromechanical Switchboard Signal. Brackett. A light hemispherical target is thrown into view by the attraction of a pivoted armature to which the target is attached. Application filed May 29, 1907. Patent assigned to the Dean Electric Company.

878,151. Telephone System. Parcelle. A local transmitter circuit is provided with branch circuits, one circuit having a microphone and each circuit having a primary winding with a separate core. Application filed September 22, 1906. Patent unassigned.

878,192. Telephone Transmitter. Dean. The main feature of this device is a diaphragm having a central stiffening rib or flange, and an electrode arranged to receive motion intraperipherally from the diaphragm. Application filed August 9, 1905. Patent assigned to the Dean Electric Company.

878,264. Telephone Central Office Apparatus. Winston. This invention has for its object the provision of means for automatically transmitting a disconnect signal to a magneto operator when a common battery subscriber hangs up first and the trunk cord is taken down. Application filed December 21, 1904. Patent assigned to Kellogg Switchboard & Supply Company.

878,265. Automatic Trunking System. Winston. This invention is designed to relieve a manual trunk operator of part of the work necessary in disconnection when the manual exchange is connected to an automatic exchange by a trunk line. Application filed January 2, 1907. Patent assigned to Kellogg Switchboard & Supply Company.

878,779. Party Line Telephone System. Dean. The invention consists in providing a separate electromagnetic device at each substation having a tuned reed of a definite rate of vibration arranged to control the signaling bell. Application filed January 22, 1904. Patent assigned to the Kellogg Switchboard & Supply Company.

879,073. Telephone and Station Apparatus. Winegott. The invention comprises pocket telephones arranged to be connected with a telephone system at any of a plurality of junction points. Keys are provided for enabling such connection to be made. Application filed December 30, 1907. Patent unassigned.

879,082. Memorandum and Recording Device for Use with Telephones. Cave. This device consists of a frame having rollers at each end upon which a memorandum strip may be wound. Means for holding carbon sheets is provided. Application filed June 3, 1907. Patent unassigned.

H. C. PRADO LEAVES CHICAGO.

AFTER nine years' sojourn in the United States, H. C. Prado, who has been connected with McMeen & Miller, Chicago, consulting engineers in the telephone field, has decided to return to Colombia, South America, his native country. Mr. Prado has made good use of his time in the United States and has acquired an experience in the electrical and telephone industry which will prove of great advantage to him in the Pan-American land. Mr. Prado was born in Santander, Cauca, Colombia, July 6, 1876. He attended the Popayan Seminary at Popayan, Colombia, and in 1895 entered the National University at Bogota, where he took a course in civil engineering. On the completion of the course he received the degree of bachelor of science. In 1899 Mr. Prado came to the United States to take a course of study in electrical engineering, graduating from the Ohio Northern University at Ada, Ohio, in 1900. Subsequently he was employed in the drafting department of the Western Electric Company, at Chicago and New York, for three years, being over two years in the latter city. He was also employed for six months in the testing department of the Fort Wayne Electrical Works. Mr. Prado has been connected with the telephone business for seven years, and for the last three years was in the employ of McMeen & Miller.

H. C. Prado.

In returning to Colombia Mr. Prado will be located at Cali, Cauca, Colombia, where he will represent several American firms and give special attention to the electrical field.

TELEPHONE LEGAL DECISIONS

A Compilation of Recent Supreme Court Findings in Cases Relating to Telephone Matters

IN NEW YORK, POLES ON HIGHWAYS DO NOT CONSTITUTE A NUISANCE, PER SE.

THE Supreme Court of New York, second department, has recently had occasion to discuss the question of the liability of a company where a passer-by has run into telephone poles placed near the edge of the traveled highways. The suit was brought against the town of Poughkeepsie, alleging that this town had permitted its highways to be in a dangerous condition by allowing the poles of two companies to be so near the edge of the traveled way as to make it possible for persons to run into the poles. The accident out of which the suit was brought occurred as follows: One of the poles was originally set some distance from the traveled portion but subsequently a free delivery mail box was placed on the pole and the delivery man in driving to the box so frequently had worn the grass so that the traveled way had reached up to the pole. The plaintiff was driving on this road at night and, as he claimed, seeing an automobile ahead of him pulled his horse and wagon to the side of the road to escape it and in so doing collided with the pole in question and was seriously injured.

The court said in discussing the question of liability of the town, as follows: "The poles were set well away from the highway as used. They were in the highway as it approached a bridge, well known to be narrower than the general way. They were in line with the guard rail as it passed along the end of the bridge. They were as conspicuous as any sign post or warning of their presence could well have been, and certainly as to one who was familiar with the situation these poles would not have suggested a greater danger than was to be anticipated from the abrupt angle of the guard rail as it turned in toward the narrow portion of the highway over this bridge. If the accident had occurred exactly at the bridge, and the plaintiff had collided with the angle of the guard rail, it could certainly not have been held that the highway commissioners were guilty of negligence in erecting such a railing, where they had left a perfectly clear way of over nineteen feet in a country road; and those telephone poles, erected by corporations duly authorized to use such highways for the purpose, did not, we think, present substantially more of an obstruction to the highway than was presented by this narrowing up of the bridge. It seems to us that, if this situation had been viewed before the accident by men of average intelligence and caution, it would not have occurred to them that the situation was one of danger to the traveler, using ordinary care in driving along a rural road, and this is the test of the duty of the highway commissioners. They are not bound to anticipate that the plaintiff or others would meet a reckless automobilist on a dark and stormy night, and that they would be crowded out of the beaten path." The suit was, therefore, dismissed.—*Scofield v. Town of Poughkeepsie, 107 N. Y. S. 767.*

TELEPHONE CONVERSATIONS AS EVIDENCE.

The Supreme Court of Alabama has had occasion to discuss the question of admission of telephone conversations in evidence in this state, in a recent case in which the Western Union Telegraph Company was a party defendant in a suit for damages for failure to deliver a telegram. Plaintiff had testified that he called over the telephone to an agent of the telegraph company to learn whether there was a telegram for him. The court stated the rule as follows: "The plaintiff did not know who the person was who talked with him over the telephone. Courts of justice do not ignore the great improvement in the means of communication which the telephone has made. Its nature, operation and ordinary uses are facts of general scientific knowledge, of which the courts will take judicial notice as part of public contemporary history. When a person places himself in connection with a telephone system through an instrument in his office, he thereby invites communication, in relation to his business through this channel. Conversations so held are admissible in evidence, as personal interviews by a customer with an unknown clerk in charge of an ordinary shop would be in relation to the business there carried on. And the fact that the person or voice of the person at the telephone was not identified does not render the conversation inadmissible. This ruling is intended to determine merely the admissibility of such conversations in such circumstances, but not the effect of such evidence after its admission. That is a jury question."—*Western Union Telegraph Company v. Rowell, 45 S. 73.*

FRANCHISE HELD VALID—NO GRANT OF EXCLUSIVE RIGHT TO COMPANY WILL BE VALID.

The city of Plattsmouth, Nebraska, in October, 1898, granted a franchise to the Nebraska Telephone Company conferring the right to erect and maintain poles and wires for the purpose of doing a telephone and telegraph business in the city. Later, on various grounds the city sought to annul the rights of the company. The court made the following statement of the law applicable to situations where a municipality has granted franchises and later has attempted to annul them: "The use of the telegraph and telephone is so far a public convenience and necessity that in some states property may be condemned therefor under the power of eminent domain. It is therefore evident that the use of streets for telephone or telegraph purposes is a use for public purposes against which no objection can be made. As said in Hobbs v. Long Distance Telephone and Telegraph Company (Ala.), 41 Southern, 1003: Since the days of the Cæsars public highways have received the careful attention of all governments, not only for the purpose of providing ways by which armies could be moved and the people travel, but for the purpose of opening up avenues of communication by which reports could be speedily brought to the capital and the interchange of commerce promoted. The laws of congress have provided for post roads, etc., before the telephone was known, provided for the same privileges for telegraph companies as were given to railways in using the public lands, and in later days it has developed the exceedingly valuable system of 'post routes' and free mail delivery along the public roads of the country is the transmission of messages from place to place. The people of the city of Plattsmouth are not alone interested in the telephone system of that city; but every other community in the state with which communication is made is equally interested, and the state itself has recognized the utility and necessity of this method of communicating news by granting a right of way for the building of such lines over the public highways of the state. Under the general power given to the plaintiff by its charter and the general control which it exercises over the streets and

public grounds of the city, its right to extend to the defendant the privilege of occupying its streets and public grounds cannot be questioned."—*City of Plattsmouth v. Nebraska Telephone Company, 114 Northwestern, 588.*

SUBSCRIBER CANNOT COMPLAIN OF INTERRUPTION OF SERVICE NOT PREVENTABLE BY ORDINARY CARE.

In a Kentucky case a suit arose between certain subscribers and the Eastern Kentucky Telephone and Telegraph Company in which the principal claim was that the service was unsatisfactory. The court said with reference to the law on the question as follows: "The evidence is not sufficient to support the judgment. It shows substantially that there was little or no trouble until after bad weather came in winter, and that the trouble then was incidental to the fact that it was a new line, a part of which ran through lands where the poles settled and the wires got wrong. The company had its headquarters at Mt. Sterling, and while there was delay in some cases in remedying defects, it was due to the situation of things, and there was nothing to indicate fraud or bad faith. A subscriber to a telephone must know that it is liable to get out of order and that a line running through the country must in winter be expected sometimes to get down. The company is bound to use ordinary care in constructing and maintaining its line, but it is not responsible for those interruptions which may not be prevented by ordinary care.

The company was bound to Hardwick and Fuller to use ordinary care to keep and maintain its telephones and lines in order, and, if it failed to exercise such care, it is liable to Hardwick and Fuller for the damages they thereby sustained. But no deduction will be allowed except where the company failed to remedy the defect in a reasonable time after it had notice of the trouble. If a defect existed and it had notice of it and failed in a reasonable time thereafter to remedy it, then from the end of such reasonable time the deduction should be computed."—*Eastern Kentucky Telephone and Telegraph Company v. Hardwick, 106 S. W. 306.*

LICENSE TO ATTACH WIRES TO PRIVATE PREMISES IS REVOKED BY SALE OF PROPERTY.

The New York courts have held recently that a license by an owner of a building to a telephone company, allowing the latter to attach its wires, is revoked and set aside by a sale of the property and that the company under such circumstances is bound to take notice of the fact of sale and procure a new license from the buyer.—*Bunke v. New York Telephone Company, 81 N. E. 1161.*

IN SOUTH CAROLINA A FOREIGN COMPANY CANNOT AVAIL ITSELF OF THE CONDEMNATION STATUTE.

It has been held in a recent case against the Postal Telegraph Cable Company that a foreign telegraph company unlicensed to do business in this state has no authority to avail itself of the statute providing for the condemnation of private property for the purpose of constructing lines thereon. This decision is equally applicable to telephone companies.—*Baldwin v. Postal Telegraph Cable Company, 59 S. E. 67.*

TRESPASS BY TELEPHONE COMPANY.

Where a telephone company, without permission, erects a pole on the portion of a private alley in the rear of a lot binding on the lot, thereby committing a trespass, and its maintenance interferes with the use of the alley by the owner of the lot, thereby constituting a nuisance, the owner, after giving the company reasonable notice, not acted on, may abate it by cutting down the pole, whether the nuisance be a private or a public one, without liability, though crossarms on the pole and the transformer thereon, put there after notice to remove the pole, be injured, at least where he does not act in a reckless and wanton manner, and this whether the title of the owner be a leasehold or a fee.—*Maryland Telephone & Telegraph Co. v. Ruth, Court of Appeals of Maryland, 68 Atlantic, 358.*

STATE REGULATION OF TELEPHONE RATES.

The fixing by a state commission of rates of charge to govern a telephone company based solely on the value of the company's property in the state as returned for taxation and its net earnings as shown by its annual reports, is a merely arbitrary act, and not a valid exercise of the power to establish "reasonable and just rates."—*Cumberland Telephone & Telegraph Co. v. Railroad Commission of Louisiana, U. S. Circuit Court, Louisiana, 156 Federal, 823.*

REASONABLENESS OF TELEPHONE CHARGES FIXED BY STATE.

There is no presumption that rates of charge for a telephone company fixed by a state commission are reasonable and just, where it is shown that they were adopted arbitrarily without any investigation of the facts necessary to enable the commission to form an intelligent judgment as to their reasonableness.—*Cumberland Telephone & Telegraph Co. v. R. R. Commission of Louisiana, U. S. Circuit Court, Louisiana, 156 Federal, 823.*

DEATH OF LINEMAN—HAZARD OF EMPLOYMENT FOR JURY.

Where deceased, a telephone lineman, was killed by contact with an electric light span wire attached to a telephone post, which wire by sagging had crossed with a feed wire and become charged, in a suit against the light company, whether such a danger was a hazard of the employment, and whether deceased ought to have known of the danger: *held,* under the evidence, questions for the jury.—*Leque v. Madison Gas & Electric Co., Supreme Court of Wisconsin, 113 Northwestern, 946.*

DEMAND FOR REMOVAL OF POLE.

Since the action of trespass lies for any direct and wrongful invasion of the possession of another, one purchasing real estate after a telephone company had built a line thereon may, after a demand for the removal of the pole and wires, maintain trespass therefor.—*Benjamin v. American Telephone & Telegraph Co., Supreme Judicial Court of Massachusetts, 82 Northeastern, 681.*

DEED TO CONSTRUCT LINE VOID AGAINST CO-TENANT.

A deed of a tenant in common, which gives to a telephone company the right to construct and operate its lines over the premises, is void as against his co-tenant unless ratified by him; nor will it operate either by way of grant or estoppel as to him or his grantee.—*Benjamin v. American Telephone & Telegraph Co., Supreme Judicial Court of Massachusetts, 82 Northeastern, 681.*

UNLAWFUL INTERFERENCE WITH TELEPHONE LINES.

Rev. St. 1899, Sec. 1261 [Ann. St. 1906, p. 1032], making the unlawful interference, etc., with telephone lines, a misdemeanor, was repealed by Laws 1901, p. 129, including telephone companies in the provisions of Rev. St. 1891, Sec. 1957 [Ann. St. 1906, p. 1324], under which the malicious injury of lines of telegraph companies was a felony.—*State v. McKee, Kansas City Court of Appeals, Missouri, 104 Southwestern, 486.*

CARE IN PLACING POLES.

A telephone company must exercise a high degree of care to select sound poles and to place them securely to prevent their fall under ordinary conditions, having regard to the effect of rain and frost loosening the ground, and prevailing winds blowing them down, and must exercise

like care in maintaining and inspecting the poles; the duty as to inspection being affected by the character of soil, weather, seasons, and such other conditions as may affect the security of the poles and the traveling public's safety.—*Harton v. Forest City Telephone Co., Supreme Court of North Carolina, 59 Southeastern, 1022.*

COMPANY NOT NEGLIGENT IN FAILING TO INSPECT POLE.

Where a telephone pole on a public road was secure before a road overseer plowed near it, the company was not negligent, as a matter of law, in failing for eight or ten days to inspect the pole; notice of its dangerous condition being absent.—*Harton v. Forest City Telephone Co., Supreme Court of North Carolina, 59 Southeastern, 1022.*

COMPANY NOT LIABLE FOR DEATH BY FALL OF POLE.

A telephone company is not liable for the death of one passing along a public road, caused by the fall of a pole, where the pole had previously fallen through the removal of its support by the road overseer and through a rain, and was propped up by other persons not connected with the company, who passed along the road shortly before the accident.—*Harton v. Forest City Telephone Co., Supreme Court of North Carolina, 59 Southeastern, 1022.*

NEGLIGENT DELAY IN REPAIRING POLE.

It is negligence for a telephone company to fail to repair a pole after six or seven days' notice of its dangerous condition.—*Harton v. Forest City Telephone Co., Supreme Court of North Carolina, 59 Southeastern, 1022.*

TELEPHONE POLE IN PRIVATE ALLEY.

Permission from the landlord will not justify a telephone company in erecting a pole in the private alley immediately in the rear of the leased lot, the lease being for 99 years, renewable forever, and the rent reserved by it being redeemable at the pleasure of the lessee, and there having been no default under the lease or re-entry by the landlord. —*Maryland Telephone & Telegraph Co. v. Ruth, Court of Appeals of Maryland, 68 Atlantic, 358.*

CUTTING OF POLE BY OWNER OF LOT.

The owner of a lot, immediately in the rear of which, on a private alley, a telephone company erects a pole, over the positive refusal of permission by such owner, does not commit a trespass by cutting down the pole, pending his suit for injunction to compel its removal, on the theory of an estoppel; the company not only having continued its invasion of his rights by putting crossarms, a transformer, and wires on the pole, after the letter to it from his attorney demanding removal of the pole and stating that unless the company did so he would apply for an injunction to compel it, but he having written it, six days before cutting the pole, that he intended to abandon his suit, and remove the pole, unless the company removed the pole at once.—*Maryland Telephone & Telegraph Co. v. Ruth, Court of Appeals of Maryland, 68 Atlantic, 358.*

STATE REGULATION OF RATES.

Laws 1905, p. 2092, c. 737, creating the commission of gas and electricity, with power to fix maximum rates for gas and electricity furnished by any public service corporation, is not invalid on the ground that the provision that the price fixed by the commission shall be the price for a term of three years, and thereafter until, on complaint, the commission shall fix a new price, denies to such a corporation the equal protection of the law, in that it makes a rate which may within three years become confiscatory by reason of an increase in price of materials used in making gas and electricity, since the corporation may in such a case either appeal to the legislature or to the courts for relief.—*Village of Saratoga Springs v. Saratoga Gas, Electric Lt. & P. Co., Supreme Court of New York, 107 N. P. Supp. 342.*

UNLAWFUL BOYCOTT OF TELEPHONE COMPANY.

During a strike of the local employes of complainant telephone company, the members of certain labor organizations, defendant, by concerted action, issued and distributed and posted different circulars for the expressed purpose of inducing patrons of complainant to withdraw their patronage, and of preventing persons from entering its employ, unless it would accede to the demands of the strikers. Such circulars characterized complainant as "unfair," as a "legalized highwayman," and its employes as "scabs." They exhorted people not to patronize it, and stated that the members of the organizations had voted to give their patronage only to certain firms because others had refused to stop using complainant's telephones. *Held,* that such acts established an unlawful conspiracy to interfere with and destroy the lawful business of complainant, and that complainant was entitled to an injunction to restrain defendants prosecuting the object of the conspiracy by such methods.—*Rocky Mountain Bell Telephone Co. v. Montana Federation of Labor, U. S. Circuit Court, Montana, 156 Federal, 809.*

IN NEW YORK COMPANIES RECEIVE THEIR RIGHT TO OCCUPY STREETS DIRECTLY FROM THE LEGISLATURE.

In a recent case against the Independent Telephone Company of Syracuse it was stated that a public telephone company organized under the provisions of the Transportation Corporation Law, laws 1890, page 1151, obtains its right to use the streets of a city for the construction and maintenance of its lines, directly from the legislature, independently of the ordinances of the city except such as provide police regulation. It will be noted that the foregoing is in accord with the Wisconsin decision referred to in this issue of TELEPHONY. However, reference must be had to the charter of the individual city in question to determine the power of the city to grant franchises.—*Gannett v. Independent Telephone Company of Syracuse, 106 N. Y. S. 3.*

ARBITRARY REGULATION OF RATES BY STATE ILLEGAL.

An order made by the railroad commission of Louisiana reducing the rates to be charged by a telephone company for service between points within the state *held* illegal and null, because adopted arbitrarily on conjecture, and not based on investigation or the exercise of judgment and discretion as required by the state constitution; and also because the rates so established were not reasonable and just, it being shown that the rates previously in force were reasonable and just to the public, and that under them the company could not earn as much as seven per cent net profit on its Louisiana investment.—*Cumberland Telephone & Telegraph Co. v. R. R. Commission of Louisiana, U. S. Circuit Court, Louisiana, 156 Federal, 823.*

ANNUAL DINNER OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

THE annual dinner of the American Institute of Electrical Engineers was held at the Waldorf-Astoria Hotel, New York City, on the evening of February 19. Carrying out the idea established upon former occasions the feature of the dinner was the tribute rendered by the speakers to the relation of the electrical engineer with public service corporations. The occasion was designated as the "Public Service Dinner," and among the speakers who responded to toasts were many men prominently identified with public service utilities, either as members of commissions or operating heads of large utilities organizations.

MILWAUKEE INDEPENDENTS WIN

The Independent Telephone Company of Milwaukee Secures an Unconditional Ordinance.

By E. S. Snowden

AFTER more than five years continuous effort, the Independents are at last going to develop Milwaukee and increase the development outside of Milwaukee very materially. Within the period above mentioned, nine different applications for Independent telephone franchises or permits have been made in the Milwaukee council, all of them except two having been refused.

In March, 1906, H. D. Critchfield came to Milwaukee, organized the Milwaukee Independent Telephone Company, having on his board of directors the following names: John M. Baer, Appleton, Wis., general manager of the Fox River Valley Telephone & Telegraph Company; W. W. Cargill, La Crosse, Wis., president of the W. W. Cargill Company, grain elevators, vice-president of the La Crosse Independent Telephone Company; Chas. J. Chapin, Milwaukee, Wis., president of the Flint Mill Company, and member of the firm of Chapin & Company; H. D. Critchfield, Milwaukee, Wis., president of the company; Howard Greene, Milwaukee, Wis., treasurer of the company, president of the Fidelity Trust Company and president of the Milwaukee Drug Company; J. C. Harper, Madison, Wis., president of the Dane County Telephone Company; B. G. Hubbell, Buffalo, N. Y., president of the Consolidated Telephone Company; Alvin P. Kletzsch, Milwaukee, Wis., secretary of the C. F. Kletzsch Company; Geo. P. Mayer, Milwaukee, Wis., president of the Mayer Boot & Shoe Company and vice-president Germania National Home; Wilmer Sieg, Milwaukee, Wis., of A. Grossenbach & Company, commission merchants; Richard Valentine, Janesville, Wis., president of the Rock County Telephone Company; J. S. Van Nortwick, Appleton, Wis., president of the Appleton Paper & Pulp Company and president of the Fox River Valley Telephone Company; E. A. Wadhams, Milwaukee, Wis., president of the Wadhams Oil Company; Richard G. Wagner, Milwaukee, Wis., president of the Wisconsin Sugar Company, and J. B. Whitnall, Milwaukee, Wis., president of the German American Bank and president of the Pennsylvania Coal and Supply Company.

An application for franchise or permit was filed in the common council on April 30th of that year, and after most vigorous opposition on the part of the Wisconsin (Bell) Telephone Company, the ordinance was passed by the common council November 12, 1906, by a vote of 45 out of 46 members of the council, with one negative vote. Being too late to begin construction work that year, it was postponed until the following spring. Engineers were employed and solicitors put to work with the result that complete detailed plans and data for the construction of the plant were made and approximately 9,000 service contracts were obtained during the first half of 1907.

In the meantime, the legislature convened in January, in which many bills were introduced, some aimed directly at the Independent telephone interests and others indirectly, seriously affecting it, and it was a question whether the Independent telephone development would be permitted to go on in Wisconsin. From the time the first bills were introduced in the legislature until its adjournment on the 17th of July, it was a continuous fight for existence. Mr. Critchfield led the opposition to such of these measures as would operate in favor of the Wisconsin (Bell) Telephone Company and against the Independents. A clean, vigorous campaign of education was waged, lasting until the session adjourned about the middle of July, with the result that Wisconsin to-day probably has the fairest and most comprehensive telephone laws of any state in the Union.

Shortly after the ordinance was passed in November, 1906, although the Independent telephone company was not objecting to any of its terms, a taxpayer, supposedly acting at the behest of the Wisconsin (Bell) Telephone Company, brought a suit to oust the Independent company from the use of the streets, upon the ground that the council had exceeded its authority and had exacted conditions from the telephone company which it had no right to do, thereby invalidating the ordinance. This case was tried in the lower court and finally taken to the supreme court, where it was pending at the time of the adjournment of the legislature. It was argued in September, the court reserving its decision until about the middle of December, when a divided court handed down an opinion holding that because of these conditions and the acceptance thereof by the company, both the action of the council and of the company in its acceptance, was void and that the ordinance was of no effect.

Meanwhile the bank panic had intervened and it was apparently impossible to re-finance the proposition. However, Mr. Critchfield did not stop, but during the months of December and January made unceasing efforts to re-organize and re-finance the proposition, with the result that by the middle of February sufficient progress had been made to justify the organization of a new company, "The Independent Telephone Company," of Milwaukee, making an application to council in conformity with the decision of the supreme court in the case above referred to.

This application was made on February 3d, referred to the committee on judiciary, which on February 14th unanimously recommended the ordinance for passage. On the following Monday, February 17th, the council suspended the rules and passed the ordinance, 42 of 43 members present voting in the affirmative. Mayor Sherburn M. Becker was in the council chamber at the time of the passage of the ordinance and signed it forthwith, and notwithstanding great pressure has been brought to bear on Mayor Becker in the hope of getting him to withdraw his signature and veto the ordinance he has steadfastly refused, and it is now in force.

The ordinance last passed is unconditional in every respect except in defining the underground district and providing that construction should be done under the supervision and to the satisfaction of the Board of Public Works.

The sentiment in Milwaukee for another telephone system is overwhelming and it is considered the best unoccupied territory west of the Hudson river.

Mr. Critchfield, when interviewed on February 24th, said:

"Arrangements for the complete re-financing of this proposition have so far progressed that I am now justified in saying that actual construction will begin as soon as the weather conditions will permit in the spring and will be pushed to rapid completion; there is some compensation for the delay in the fact that the prices of materials have de-

clined very much, labor is more plentiful and delivery of all things required for the plant can be made immediately upon receipt of order. We expect to have this plant completed and in operation by May 1, 1909.

"It is our plan to build toll lines, this summer and fall, north and west, and give connection between outlying Independent properties and Milwaukee when the plant is opened. We also hope to have Chicago connection by that time."

Milwaukee will be in line, and the splendid fight made by Mr. Critchfield has been won. All Independents will welcome the Cream City to the Independent ranks.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, PITTSBURG SECTION.

ON February 5 the Pittsburg Section of the American Institute of Electrical Engineers held a meeting in the Carnegie Institute Lecture Hall after an informal dinner at the University Club. Several original papers were read and discussed, a short summary of which is given below.

Henry W. Fisher of the Standard Underground Cable Company read a paper on "Varnished Cloth Insulated Cables," which was very interesting and instructive, and while most of the processes of manufacture are still secret, Mr. Fisher gave some good data. The samples of cloth are made in thicknesses varying from five to sixteen mils The specific gravity of varnished cloth is very close to 1 and while the electrical properties of different makes vary widely, some average tests made on samples a circular foot in area showed as follows: Insulation resistance from a few megohms to 955 megohms; alternating electrostatic capacity from .11 to .26 microfarads; break down electromotive force from 120 volts to 860 volts. The power factor of varnished cloth is an important consideration. One sample when tested with 20,000 volts for two hours became very hot, while a similar sample of another kind was perfectly cool after a similar test. Mr. Fisher exhibited a number of samples of varnished cloth cables, some lead covered and others covered with an asbestos braid for switchboard work.

A. B. Reynders of the Westinghouse Electric and Manufacturing Company explained the great variety of uses varnished cloth is put to in modern electrical machinery. As an insulation for curved surfaces it stands alone. He also explained the different processes of its manufacture and that when finished it would stand a voltage of from 800 to 1,200 volts per mil of thickness. The methods of inspection and testing are important to see that the cloth will stand bending and creasing without breaking down. The testing surfaces should be flat disks. The cloth should stand baking at high temperatures for a number of hours without being injured. A temperature of 300° F. or over will injure the mechanical strength of the cloth.

G. A. Jacobs of the Sherwin-Williams Company expounded the technical requirements of varnish in varnished cloth. He called attention to the fact that it was impossible to have a quick drying varnish that will remain permanently elastic. A varnish should never lose its life and elasticity when used at temperatures below 180° F. He said that most oxidizing or drying agents keep on working and drying out after the process was supposed to be stopped and for that reason alone the varnish lost its elasticity with age. Hot air is one of the most reliable oxidizing agents. Varnished cloth should also possess a tackiness which is useful in making it adhere to itself.

Dr. Riddle read a paper for James Todd of the Sterling Varnish Company. Mr. Todd believes that the mechanical properties of varnish insulated cloth are just as important as the electrical properties. A cloth should be given an endurance test as well as a quick-puncture test. Varnished cloth is best when made up of a succession of layers dried one on top of the other. Some kinds of oil tend to rot the cloth. Linseed oil should be purified before being used.

In a general discussion of the subject S. P. Grace, chief engineer of the Central District and Printing Telegraph Company, called attention to a varnished cloth insulated cable several miles long, used by the Pittsburg Railways Company for carrying a three-phase current of 13,000 volts from Brunot's Island to Bellevue. This cable is hung serially, without lead sheathing, and has been working for several years without giving any trouble with the exception of one splice that was improperly made. He considered this an important stride onward in the art of high tension power transmission. He also spoke of trying varnished cloth distributing wires for telephone service.

Mr. Paul Lincoln called attention to the use of varnished cloth insulated cables as a protection against breakdowns caused by electrolysis.

Mr. Rowe called attention to the advantages of using varnished cloth insulated cables with asbestos covering for power switchboard work and short duct runs. He called attention to the great permanency of everything about a switchboard except the reliability of insulation on cables. He thought this should be made as permanent as the barriers they build for protection. He spoke of the advantage of doing away with bells on cables without lead covering.

C. E. Skinner thought that the varnished cloth insulated cable with an asbestos covering was a great point when considering the fireproofing of wires. He also spoke on the subject of the manufacture of varnish, calling attention to the three principal methods of oxidizing linseed oil. These agents consist of, first, heated air; second, borate of manganese; third, oxide of lead.

Messrs. DeWolfe and Sandborn gave some data regarding power factors and weakness of varnished cloth with rise of temperature. Some linseed oils under test show a power factor of fifty per cent and other oils show as low as one per cent.

Mr. Wilson spoke highly of varnished cloth insulated cables, which he has been using for some time. They are absolutely unaffected by oil.

FROM FAR HAWAII.

FROM E. B. Carley, manager of the Maui Telephone Company, which operates a number of exchanges on the island of Maui, in the Hawaiian group, TELEPHONY has received an interesting letter about telephone conditions in that faraway territory of the United States. The headquarters of the Maui company are at Paia. Maui is the second island in size in the Hawaiian group and has an area of 700 square miles and a population of 35,000. The company has 450 subscribers, all of which use magneto bridging telephones. The company has been in existence since 1889. The officers are: President, H. P. Baldwin; vice president, D. C. Lindsay; treasurer, E. B. Carley; secretary, W. S. Nicoll; auditor, C. D. Lufkin.

We clip the following from the company's directory on "How to Use the Telephone:"

"Some practical hints as to how to use the telephone have recently been published, and some of them are well worth repeating. One man will get right up to the telephone and say what he has to say loud enough to be heard a square away. The next one stands away back and does the same thing, while a third will almost whisper into the instrument. There is only one way to talk through a telephone and the "Central" might be saved a world of trouble and undeserved abuse if all users would carefully learn and follow it. That way is to stand a little back and talk in an ordinary tone, as if you were talking to a man a couple of feet away, instead of one, two or more miles away over a wire. Don't yell, don't whisper; simply speak in an ordinary tone, and distinctly. The words are carried by electricity, not by the force of your enunciation. The instrument is not like a deaf man, but on the other hand, it is extremely sensitive."

Manufacturer's Department

By W. H. Graffis

THE DOUBLEDAY-HILL ELECTRIC CO.

"INDUSTRY," a financial and industrial publication of Pittsburg, Pa., recently devoted several pages to an illustrated article concerning the Doubleday-Hill Electric Company, of 919 Liberty street, that city.

This company, which is widely known throughout the telephone field as large dealers in telephone supplies, began business, according to "Industry," in one room in the Lewis Block, ten years ago. This fact is most interesting in view of the present large building which is the business home of the concern. There are eight floors in the building, ag-

Front section of the business office—Mr. C. P. Hill at his desk.

gregating more than fifty thousand square feet of space, all of which is constantly filled to overflowing.

In addition to this, the company has two large auxiliary warehouses for the storage of surplus stock and maintains a large branch supply house at Charlotte, North Carolina, from which point it takes care of the southern trade. Its business extends all over the world, and is constantly growing, due to the strict adherence to the maxim, "Highest grade, quickest delivery."

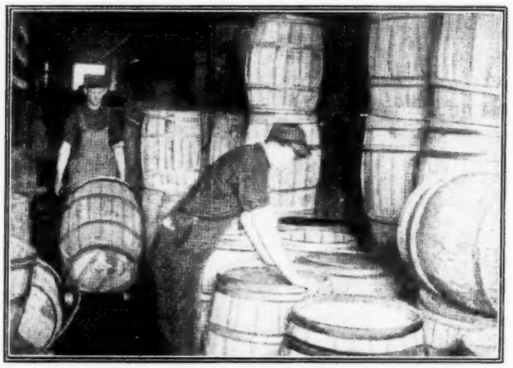
The Doubleday-Hill Electric Company is incorporated under the laws of the state of Pennsylvania with an authorized capital of $300,000. C. Phillips Hill is president, G. B. Hill, vice-president and treasurer and H. G. Shaler secretary.

It employs a force of fifteen road men, who cover New York, Pennsylvania, Ohio, West Virginia, Tennessee,

View in general salesroom.

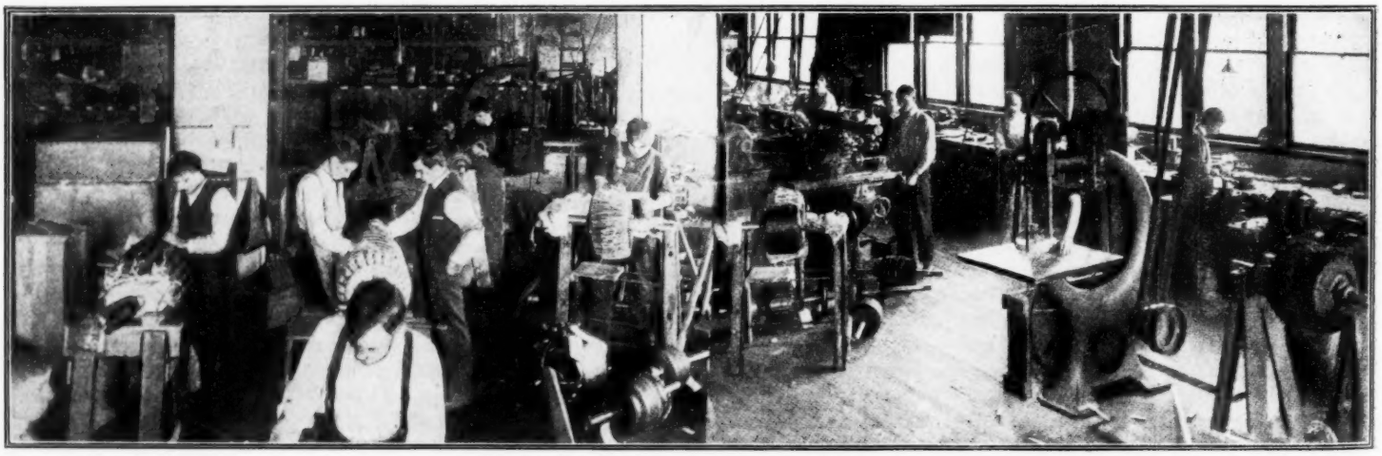
Maryland, Virginia, North and South Carolina, Georgia, Florida and Alabama.

The company advertises in TELEPHONY and other leading



Corner of the insulator department on the sixth floor.

trade journals of the country and is recognized as one of the foremost progressive concerns of the United States. It caters to many of the largest electric light and traction com-



A sectional view of the factory—A busy place.

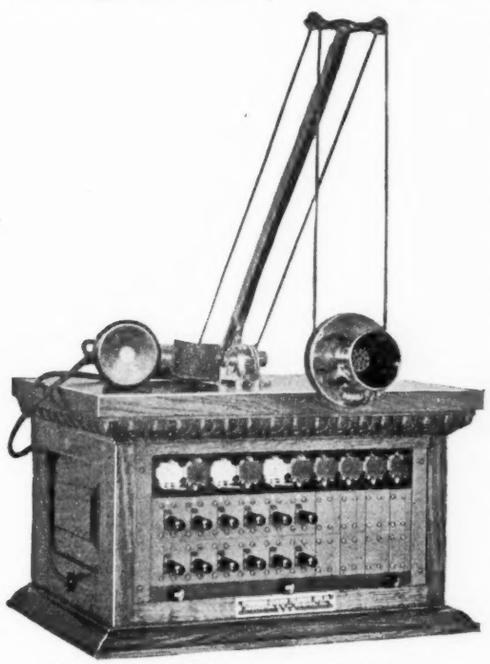
panies in the United States, electrical contractors, telephone companies, mines, mills, factories and industrial plants of all kinds, as well as to wholesale and retail distributors everywhere.

This company supplied some of the electrical equipment for the United States Naval Academy at Annapolis and the Terminal warehouses of Pittsburg, the largest of their kind in the world, were equipped with conduits and wire supplied by the Doubleday-Hill Electric Company.

Telephone men will find this concern especially well prepared for prompt shipments on line supplies and construction materials of all kinds. Catalogues and bulletins will be sent regularly to parties sufficiently interested to send in their addresses.

TEN-LINE CORDLESS SWITCHBOARD.

A NOVEL switchboard equipment is found in the ten line generator call cordless switchboard designed by the Stromberg-Carlson Telephone Manufacturing Company.



Stromberg 10-line cordless switchboard.

This equipment is placed in the smallest cabinet ever turned out by the Stromberg-Carlson Company; its No. A-5364 cabinet. This can be set upon a desk, table, or set back under the pigeon holes in a roll top desk. The dimensions are of special interest. The depth from the face to the back of the cabinet is only 9 inches, the height 8¾ inches and the width 13 inches. In the upper part of the face are mounted the line drops. Immediately below these are the ringing and listening keys for their respective lines, and below these in turn are the connecting keys. The latter are for the actual connection of the subscribers for talking. The operator can connect any two subscribers by throwing the handles of their connecting keys in the same direction. These keys are so wired that by throwing the handles of all the keys in the same direction the subscribers' lines will all be connected together in multiple. This enables them to ring one another independent of central, and is very handy during periods of the day when there are not enough calls to require the operator's service.

The push button keys in the lower part of the face equipment are used for various auxiliary circuits. One lettered "Opr." is for closing the transmitter battery circuit. To the right of this is a night bell key designated by "N. B."

Three different operators' equipments are furnished with this type of switchboard, affording great accessibility and freedom of position for permanent locality in the switchboard. For the average customer, this switchboard would probably prove more desirable when equipped with the ordinary desk set in place of the operator's head band receiver and suspended transmitter, as shown in this particular illustration. In addition to either of these equipments, the regular operator's breast plate transmitter will be found very acceptable for an operator who manages a switchboard and typewriter at the same time.

Since the introduction of this design of switchboard, the Stromberg-Carlson Telephone Manufacturing Company reports active interest on the part of many telephone men and has prepared for other interested parties a complete and carefully illustrated pamphlet No. 4. Copies of this pamphlet in any number will be furnished free upon request.

HARMONIC RINGERS.

BY KLAS WEMAN.

CONSIDERING the marked step of advance the art of telephony made by the production of a four-party harmonic ringer, which really had practical and commercial value, the criticism regarding its narrow limits is certainly unfair. It is indeed very seldom that a design of a new mechanism produced to fill an urgent necessity is brought out to perfection at the first attempt. Particularly in this instance where the exceedingly handy factor, the ground, was eliminated the achievement must be given due credit.

The criticism from the operators is, of course, dictated by their desire to obtain an article that has a wider margin and needs less careful adjustment and less accuracy of the different frequencies.

From some of the manufacturers their objection is probably due to their inability to produce something of even equal efficiency, and their offering a system having a wider margin so far invariably shows a ground auxiliary. This may be in a way acceptable on magneto systems, but it will hardly tempt the engineers of a common battery equipment.

The fewer grounds there are on a common battery line, direct or party, and the more it can be kept free therefrom the better the efficiency of the whole system, and a party system that does not depend on ground at the subscriber's station will absolutely be favored by the modern operator, even considering the limited margin of the present harmonic ringers. The trouble the operators are experiencing with the harmonics and their keen search for something less limited should act as a stimulus on the manufacturers to develop a ringer that may be handled by the "combination man" and that is not so dependent on accuracies.

In the first place the micrometer adjustment of the gongs should be eliminated.

That the action of the present forms of harmonics depends on the rebound of the gongs to a great extent is unfortunately true, but is this principle really the only one? A design that would allow a certain amount of give or relative self-adjustment in movement of armature and clapper would in all probability considerably widen the present limitations as to adjustment of gongs. It certainly is desirable that the harmonic ringer does not require a more careful adjustment than an ordinary ringer. Then there is the tell-tale hum at all three party stations while the fourth is being called. A certain amount of this hum is to be found in the electro magnet coils themselves and cannot be eliminated when high frequencies of fifty and sixty-six cycles are used, but this would hardly be sufficient to attract the attention.

The fact that the armature is supported from a fixed point in relatively close proximity to the polepieces accounts largely for the hum. The further away from the polepieces the fixed supporting point was located the less chance of humming would there be.

Suppose the action of the armature and clapper rod with its properties of responsiveness to a corresponding frequency be considered as a vibrating string. We find that this may have several parts vibrating with different frequencies when held at different points, which would then be neutral or non-vibrating.

If some parts are longer than others they vibrate at a lower frequency than the shorter parts.

Suppose that the armature represents one of the short

parts of a vibrating string and corresponding to a current of a certain frequency. The clapper rod could certainly be made to represent the longer part of the string and vibrate at an entirely different frequency with a neutral non-vibrating point between the armature and the clapper and still be actuated by the armature. Such an arrangement would probably establish a floating self-adjustment between the armature and the clapper so that the gongs did not have to be so very carefully adjusted as is now necessary.

It would also probably eliminate the greater part of the hum, more so if the armature can be given a swinging pendulum motion and not the short jerky action of the ordinary polarized ringer. A design of this kind would, in all probability, also allow the use of smaller clappers.

Such a ringer would decidedly be a welcome addition and another step forward.

HARGIS JOINT MAKES MORE FRIENDS.

FOLLOWING is a letter received from the Ocala Telephone Company, Ocala, Fla., by W. N. Matthews & Bro.: "We have your favor of the 6th instant. We have sent you by to-day's mail a photograph which shows one Hargis Cable Splicing Joint installed and our superintendent C. B. Carr in the act of connecting up another. We have used about 25 of these joints and we intend to use them exclusively in the future unless we find something better, which we very much doubt. We are using them in multiple tap work. We like them better than the long sleeve joint specially, because we can change one pair of wires from one box to another without breaking the sheath of the cable. We believe the Hargis Joint to be moisture proof, as we have had no trouble along this line and the joints have been put to severe tests."

BITUMINIZED FIBER CONDUIT.

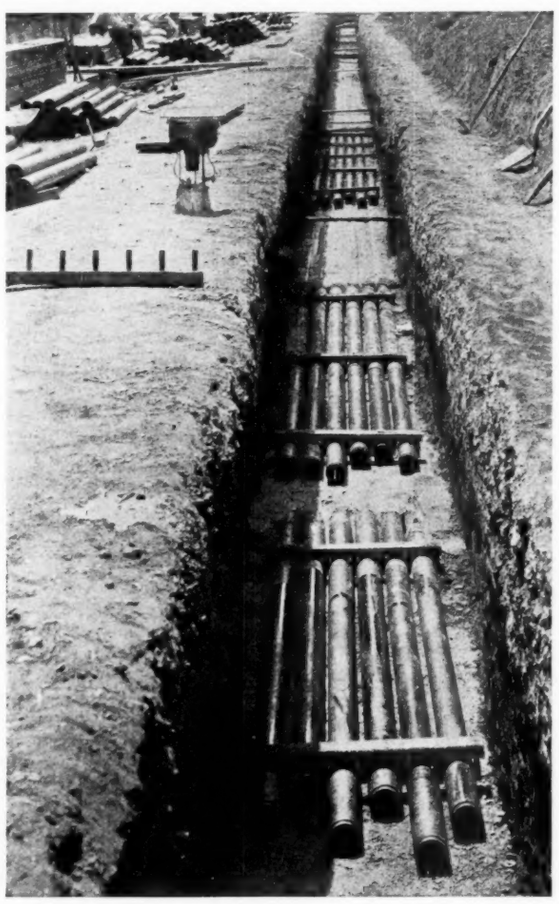
BY BERNARD C. GROH, ENGINEER AMERICAN CONDUIT COMPANY.

RECOMMENDED by many of the most competent engineers of the United States as a highly efficient material for use in the construction of underground electrical conduits, Bituminized Fiber Conduit is rapidly coming into general use as a receptacle for underground wires and cables.

Bituminized Fiber Conduit is manufactured by the American Conduit Company and is a cylindrical tube or duct, the walls of which are made up of laminations of a special fibrous material, each lamination being thoroughly saturated with a bituminous compound, and also coated with a thin film of this same compound. The wall of the duct is really made up of alternate layers of fiber thoroughly saturated with bituminous compound, and films of the compound itself. This construction results in a product of the greatest strength and offers the greatest possible resistance to the penetration of moisture.

The material from which Bituminized Fiber Conduit is made is of a bituminous nature and is therefore absolutely non-corrosive. The fiber entering into its construction is so thoroughly saturated with the bituminous compound as to practically lose its identity except for the stiffening and strengthening qualities for which it is used. It is thus entirely protected against moisture or other elements which might cause decay.

Bituminized Fiber Conduit was originally designed as water pipe for irrigation purposes on the Pacific coast. There is in California many miles of this pipe in sizes of from two inches to ten inches in diameter. This pipe is all underground and installed under conditions most unfavorable to long life. It is in all kinds of soil, both wet and dry, alkali and otherwise, with no concrete or cement protection



Trench filled with bituminized fiber conduits.

and having water flowing through it for days at a time and again remaining empty for equal or longer periods. This conduit has been in service from twelve to fourteen years and there is no sign of deterioration in any of the conduit.

Bituminized Fiber Conduit is made up with three-eighths inch walls, and, with the exception of the inch and inch and one-half size, approximately seven feet in length. The inch and inch and one-half conduit is supplied in five foot lengths. The standard conduit is provided with a plug and socket joint. The ends are turned true in a lathe. By means of this joint the conduit is self-aligning and no mandrel is necessary when installing the conduit.

The manufacturers of this product recommend that the joints of Bituminized Fiber Conduit be sealed when installed, thereby providing a water and gas tight tube from

manhole to manhole. With every shipment of conduit a sufficient quantity of compound for this purpose is included.

In laying Bituminized Fiber Conduit the following method has proven to be economical and effective for telephone work: The trench is excavated and graded in the usual manner employed for other types of conduit. It has been the practice in the past to provide a base of concrete from two to four inches in thickness, although many good engineers do not feel that this base is necessary and are laying the first horizontal tier of conduits directly on the floor of the graded trench.

A number of comb shaped devices are provided as shown in the illustration, one of which is shown on the bank. The teeth of the comb are of such a size that when used to properly align and space the conduit, the separation between each conduit of a horizontal tier is one inch.

The conduit having been hauled out on the work and distributed along the trench, it is laid in the trench one tier at a time. Four men are usually employed in this work. Two men work in the trench, and two on the bank. One on the bank hands the conduit to the dipper who dips the socket end of the conduit in the sealing compound and quickly hands it to the men in the trench who, as it is fitted into the plug end of the conduit already in position, give it a turning motion which effectively seals the joint. The compound is kept warm by means of a plumber's furnace.

These four men rapidly lay the tier of conduit and the concrete gang follow them closely and place the concrete around the tier of conduits. With plenty of trench open, a gang of sixteen men mixing and hauling and placing concrete is required to keep pace with the one man and three helpers laying the duct.

A wet concrete with three-quarter inch stone or gravel is used. In placing the concrete around the tier of conduits one man spreads and another tamps the concrete around the conduit with a chisel shaped tamp.

As the concrete is placed, the combs are removed and placed on the bank to be used in laying the next tier. The duct layers lay the conduit as far as it is economical to wheel concrete, and the process is repeated for each layer except the last when the concrete is carried two or three inches above the last duct for protection against damage from foreign excavation. The distance between the wall of the trench and the outer conduit should not be less than two inches for the same reason.

A working force of the above size and organization will easily average 6,000 duct feet of Bituminized Fiber Conduit in ten hours, provided the trench is ready.

The American Conduit Company manufactures Bituminized Fiber Conduit with interior diameter of one to ten inches and supplies bends for each size. A large stock is constantly maintained for the convenience of the company's many customers. The western office is located in the Marquette Building in Chicago. The eastern office is at 140 Nassau street, New York.

TWO NEW MAGNETO MULTIPLE BOARDS.

MAGNETO switchboards of a most improved and modern type are now being installed at Decorah, Iowa, and Sullivan, Ill. Both are multiple boards, constructed by the Monarch Telephone Manufacturing Company, of Chicago, and are additional evidence of the progressiveness which that company has always shown in the manufacture of telephone apparatus. One of these boards was exhibited at the recent Electrical Show in Chicago and attracted considerable attention. This board has 640 lines installed and is divided into two sections with two positions to the section. Each position is equipped with multiple jacks for all the lines installed and has a capacity for a full multiple of 1,600 lines to provide for future growth. The claim of accessibility which the Monarch company makes for its apparatus is strongly substantiated in these boards, as all parts are easily reached and any part can readily be removed without interfering with the operation of the board. The drop coils can be removed easily and quickly from the back of the board without even disturbing the adjustment of the armature and shutter. The ringing and listening keys are simplicity itself, having but few parts and so constructed that the tension on the springs is distributed throughout their entire length, thus reducing the wear and prolonging the life of this part. The key, like the drop coil, can quickly be removed from the escutcheon and easily taken apart. Each position is equipped with a four party master key for direct current selective ringing. This master key has four buttons for the four parties and a fifth button for alternating current which acts also as a release key for the other buttons. Throughout the entire equipment there is evidence of careful attention to mechanical details as well as to the electrical requirements of the boards.

At Storm Lake, Iowa, another four position magneto board is being installed by the Monarch Company and while it is not a multiple board it has a feature which deserves special mention. Each cord circuit is equipped with two lamp recall signals so that either of two connected subscribers can secure the attention of the operator without ringing the other's bell. This is done by operating the hand generator which lights one of the recall lamps in the cord circuit, and is accomplished without using a relay. In this way a subscriber can signal the operator even though the clear out drop has not been restored.

INCREASED FACILITIES.

MATHIAS Klein & Sons, Chicago, Illinois, has increased its facilities in the way of a new factory, operating in conjunction with the old one. The new plant is fully equipped with machinery and tools. Power is generated by a 60 horse-power Munzel suction producer gas engine and gas generator, and is distributed partly by shaft and belting, and partly by electric current supplied by a 30 kilowatt generator, which also supplies current for lighting. The new plant is located at Nos. 223-225-227 Clybourn avenue, where the warehouse is also located. With these additional facilities, the firm hopes to be in position to take care of its friends better than ever before and wishes to thank all for the consideration shown it during the strenuous times of the several late years.

THE VAC-M LIGHTNING ARRESTER.

THE Vac-m lightning arrester manufactured by the Michigan Electric Specialty Company, Muskegon, Mich., is the invention of a telephone man who has been in the operating field for the past ten years. The arrester herewith illustrated consists of an hermetically sealed glass bulb, mounted on a porcelain wall receptacle and having terminals for connection of line and ground. The air has been partly removed from the bulb, making a partial vacuum therein. The electrodes are mounted in the globe, separated from each other by not less than 1-8 inch. These electrodes are wired to the outside terminals, one of which, in the grounded circuit type, is for connection to line, the other to ground. It is a well known fact that a partial vacuum presents a very low resistance to static currents, such as lightning, but a very high resistance to other forms of electricity, such as are used in telephony. Lightning therefore discharges readily across the space in the arresters while the service currents are not affected at all by it. The Vac-m arrester, therefore, is said to make the ideal apparatus for this purpose.

Vac-m Arrester.

The electrodes are separated so far that if any especially

heavy discharge should tear off small particles from the electrodes, they can not cause a ground as in other arresters. One feature of lightning arresters which is of the highest importance, and yet appears to have been heretofore entirely overlooked, is that on a metallic line equipped with them, the two sides of the line are never equally charged, and the resistance of the gap spaces on the two arresters on either side of the line are not equal.

The discharge nearly always arcs on one side first, thus lowering the resistance at that gap space much below that of the other.

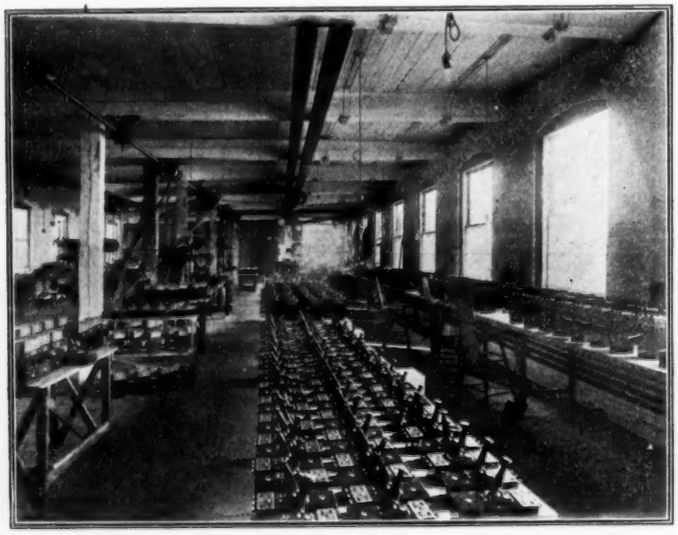
The other arrester does not discharge, but the charge on that side of the line passes through the bell or switchboard coils to the side which is discharging, and burns out the coils in passing.

In the Vac-m arrester the small static discharge passes as readily as the larger, as it does not pile up before passing. Interested parties are requested to write the Michigan Electric Specialty Company, Muskegon, Mich., for descriptive matter concerning this specialty.

CONSIGNMENT MADE TO DETROIT HOME TELEPHONE COMPANY.

THE shipment, herewith illustrated, contained twenty-seven cases of Gray pay stations, and weighed three tons, the consignment being to the Home Telephone Company, of Detroit, Michigan. The fact that the Home Telephone Company, of Detroit, is credited with using nothing but the best, and its selection of the Gray pay station, affords a strong comment on the desirability of Gray equipment. With Gray pay stations the user has but to drop in the coin and the signals are sounded automatically, a feature appreciated by those who desire rapid and satisfactory service. From a maintenance standpoint, the simplicity of Gray apparatus with no springs, levers or other movable parts to wear or get out of order, also tends toward low cost. Quick service and low maintenance are fundamental principles of Gray construction.

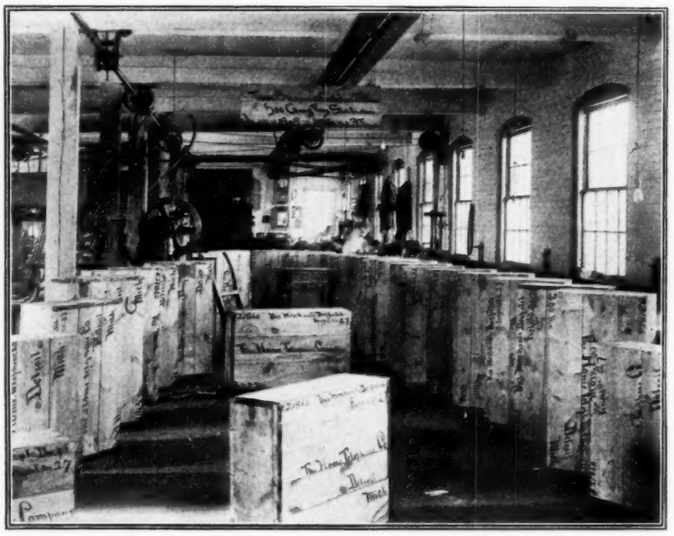
Beginning over twenty years ago as pioneers in its line, this company has built upon a foundation where only experience, consistent study and actual test have blazed the way.



Gray pay stations ready for shipment to the Detroit Home Telephone Company.

Each detail has received deliberate and thorough consideration in its gradual development. Progress has been made along conservative lines, and success has been achieved only through the slow but sure process of evolution. Expert engineering and manufacturing skill have been united and the company has adhered strictly to the use of the highest and most thoroughly tested materials, regardless of cost. These important factors, combined with the best machinery obtainable for the production of toll equipment, makes, it is claimed, it possible to manufacture goods of the highest merit and creditable to the name it bears.

The Gray company has in actual use some 200,000 pieces of apparatus. It owns more patents, it is said, on toll equipment than all other makers combined, and in its latest



Gray pay stations boxed for shipment to the Detroit Home Telephone Company.

catalogue describes and illustrates over fifty different types of pay stations. This catalogue will be sent to all interested parties with samples and prices upon request.

THE BLAKE SPECIALTIES.

THE Blake Signal and Manufacturing Company, of Boston, Mass., offers the telephone trade three attractive specialties in its insulated staples, compressed cleats and tube flux for soldering.

The latter article is not only represented as an exceptionally good fluxing solder but it is neatly put up in a collapsible tube, and the spout of the tube being of platinum tapering to a neat point, the flux can be readily applied at the precise point desired.

The Blake Insulated Staples are designed for use on all low voltage circuits of interior wiring, such as telephone, telegraph, messenger call, annunciator and bell work. These are a standard, square-shouldered staple, having good driv-

Blake Tube Flux for Soldering. Full size of tube 1″x5″.

ing qualities. The fibre insulation on these staples cannot come off in driving, it is said. The double thickness of insulation, under the head of the staple, gives a large surface of contact with the wire, to stand mechanical strain. The staple can be driven over two or more wires without danger of causing a cross. The insulation on these staples gives an added protection from leaks on grounds on the wiring. When used in damp places it also protects the braiding on the wire from rust or corrosion of the staple. Furthermore, it is said, that wiring can be done with Blake Staples in one-half the time required for cleat work. The Blake insulated staples cost less than the screws alone used with porcelain cleat work.

The Blake Compressed Cleats are made for low voltage, interior circuits when run over plastering or other places where Blake Staples can not be used.

These are compressed cleats treated so as to be impervious to dampness and moisture.

There is said to be no breakage in the use of these compressed cleats, whereas with porcelain cleats there is said to be a breakage of from 20 per cent to 25 per cent between the factory and the installation. These cleats, it is claimed, will not break under the blow of a hammer, so that nails can

The Blake Insulated Staples.

be used as well as screws. This enables a saving to be effected in both material and labor.

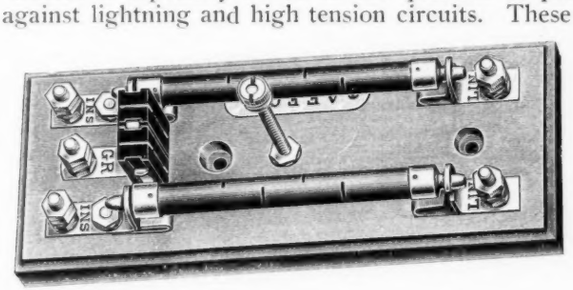
Blake Cleats cost much less than either porcelain or fibre cleats. When stringing long runs of wire the end cleats will hold the slack until the wire is secured at intermediate points.

Blake Compressed Cleats. Exact size.

The Blake Signal and Manufacturing Company will be glad to furnish all interested parties samples and prices of its various specialties.

AMERICAN APPROVED PROTECTORS.

AT this time of the year, the attention of telephone operators is especially called to the question of protection against lightning and high tension circuits. These are



American approved protector, No. 991.

the elements which cause most of the trouble around an exchange and more especially at the subscriber's instrument. Either one may burn out a telephone and cause a loss to the company, or set fire to the building and cause

American approved protector, No. 991, with cover.

heavy damage. Also, it always is possible that some telephone user may be injured or killed.

It is always a good plan to have telephone instruments well protected and the best protector is none too good for this purpose.

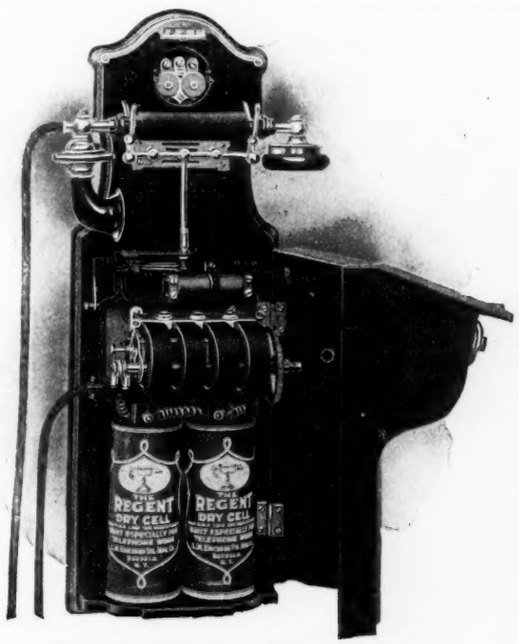
The American Electric Fuse Company has made telephone protectors a specialty for sixteen years and is now offering, it is said, the largest line of these protectors, manufactured. Leading the American line are five approved protectors which have passed the inspection of the National Board of Fire Underwriters. Their catalogue numbers are 990, 991, 997, 998 and 999.

All of these American protectors are so constructed as to protect absolutely against fire, and they are tested to operate instantly with high tension currents of any kind. The five approved protectors include different combinations. Some have heat coils, others have self-cleaning lightning arresters, and all have tubular fuses.

The American Electric Fuse Company will be glad to forward circulars or further information on request, in regard to this line of apparatus.

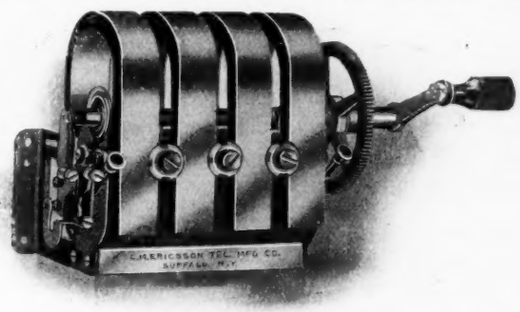
A THOUSAND STEEL SETS IN A DAY.

THE L. M. Ericsson Telephone Manufacturing Company, of Buffalo, N. Y., reports exceptional progress with its new steel telephones, the largest shipment of which was made recently when 1,000 sets were shipped in one day



Ericsson magneto cradle switch type.

on one order. This report would seem to indicate that the steel telephone has come to stay, and will soon be in a fair way to supplant the older wood type. The Ericsson company has a product in its all steel telephone, the magneto



Ericsson handmicro telephone.

cradle switch type of which is illustrated herewith, which telephone men have not been loth to thoroughly investigate, and to their evident satisfaction.

As will be seen in the accompanying illustration, the front

of the cabinet swings wide and affords the "trouble man" convenient access to all working parts. The front may be removed entirely if desired by merely lifting it from the hinges. The ringers are connected by long flexible wires, which allows them to be tested when the front of the cabinet is removed. All working parts are standard Ericsson, the four-bar generator being equal in efficiency, it is claimed, to many five-bar of other makes. This is made possible by the exceedingly fine grade of magnet steel employed and the minimum air-gap. The gears are ground together insuring ease of operation and freedom from the so-often-found harsh noises.

The Ericsson handmicro telephone continues to grow in popularity, it is said, because of the many possibilities it presents regarding convenient telephoning. It is the original handmicro and has many features which are claimed to make it unapproachable either from the standpoint of beauty or efficiency.

Interested parties should write for Booklet "B," describing the steel telephones and ask for net prices.

NEW STEEL REELS AND SPOOLS.

WOODEN and cast iron reels and beams are to be replaced by the new patent stamped steel article manufactured by the Frank Mossberg Company, of Attleboro, Mass. Wooden reels are said to deteriorate with constant use while cast iron reels, once dropped to the floor, are broken and of no value. The new steel reels or beams are said to be practically indestructible and about 25 per cent lighter than cast beams. The reels are especially adapted for wire braiding machines, and for winding magnet wire. The Frank Mossberg Company claims that machines can be equipped with any size of reel or spool between 2½ and 40 inches. The company's long experience with this class of work in its many peculiar phases renders it unrivaled, it is said, in the manufacture of reels and spools. Descriptive matter can be secured upon request.

Mossberg steel reel.

THE "READING" STANDS ROUGH USAGE.

THE following letter received from Messrs. H. C. Hansen & Son, Ogden, Utah, agents for the Reading motor cycle which is manufactured by the Reading Standard Company, of Reading, Pennsylvania, may be of some interest to TELEPHONY readers:

Upland, Cal., Jan. 17, 1908.

Messrs. H. C. Hansen & Son, Ogden, Utah.

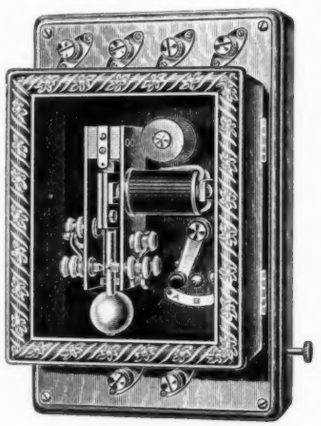
Gentlemen: I have been intending to write you for some time in regard to the motor-cycle, which I purchased from you last September. I still have my wheel, and it is all O. K. yet. I have ridden it every day since I left your place, and am indeed very well pleased, having not paid over $5.00 for repairs in all. I still have the same tires, and have crossed the desert with them, which took them down pretty bad. I was nearly a week on my way from Salt Lake City, to San Bernardino, Cal., which is near Los Angeles, and wish to say that I only had one puncture, which was caused by a cactus thorn, which worked through near Daggett, Cal. When I was about 200 miles from Salt Lake City, I could get no gasoline, and so had to try some distillate, which I got at a railway house. The machine went all right with this, but would not start with as much force. I decided that I had better carry some extra gasoline with me, as the towns were getting rather scarce, and the roads were so blank that I could not follow them, and sometimes could not even see where they were. * * * I covered a distance of over eight hundred and eighty miles from Salt Lake City. My carburettor failed me when I was about twelve miles from the end of my trip in the mountains of California, but I schemed and figured and finally put a little rock on top of each float, and then I was all ready. My batteries tested eight emperes when I was at the end of my journey, I tightened up my chains, and everything was as ever, but hardly think I will undertake this trip again unless I have an airship.

I took my engine apart the other day, and it is as good as new. * * * Yours truly,

O. F. TRAINER.

THE SANDWICH POLE CHANGER.

THE Sandwich Pole Changer as illustrated herewith is extremely simple, rigid and compact in construction. Its mechanism is mounted on an oak base and covered by a neat, oak, hinged box with beveled plate glass front and complete instrument.



Sandwich pole changer.

It is so constructed that it will work either in a horizontal or vertical position, thus admitting of it being mounted on a cabinet or hung on the wall, and as it is practically noiseless it is not objectionable in the operating room. The machine has but three contact springs, which have points of very heavy platinum. The contact springs engage alternately from their opposite sides and consequently cannot be forced out of their normal position by extended use. As the whole mechanism is securely mounted and locked in one solid, heavy brass frame, it is impossible for any parts to get out of adjustment, and therefore it is said never requires adjustment after leaving the factory. No primary cell is used, as the vibrator is operated directly from the main batteries through resistance coils. This eliminates renewal expense of the secondary battery and also does away with the trouble from frozen elements when it is necessary for the ringer to be kept in a cold room during frigid weather. It is claimed that this is the finest instrument of its kind ever placed on the market and is guaranteed in every respect. Detailed information concerning this device will be furnished to those addressing Sandwich Pole Changer Company, Sandwich, Ill.

TELEPHONE BROKERS AND PROMOTERS.

O. E. CHANEY & COMPANY, 414 Metropolitan Bldg., Minneapolis, Minn., investment brokers, announce in the advertising columns of this issue that they make a specialty of buying and selling high grade telephone securities and telephone systems, and that they also are prepared to promote and advance any legitimate telephone proposition. Interested parties are invited to confer with them regarding details.

A DIRECT CURRENT COMMON BATTERY TELEPHONE

A Study of Development of Circuits for Common Battery Sub-Station Sets

By C. D. Enochs

Chief Engineer The Vote-Berger Company, La Crosse, Wis.

THE original telephones, as designed by Dr. Bell, can hardly be classed as either local battery or common battery instruments. The talking current was generated by an instrument which was in principle the same as the ordinary receiver of to-day. The movement of the diaphragm under the influence of the voice vibrations generated a current by varying the number of magnetic lines passing through the diaphragm and the coils of the transmitting device. This current was necessarily alternating in character. The local battery telephone, which was developed as soon as the variable contact transmitter was invented, generated the voice currents by the fluctuation of current through the primary of the induction coil and the transmitter, and this sent an alternating current from the secondary of the induction coil to the line.

The introduction of the common battery, or central energy switchboard a number of years later brought with it a new problem in the matter of designing circuits and apparatus to be used in the telephones operating with this new type of switchboard. It will be noted, however, that in the circuits discussed later that up until the production of the new direct current common battery telephone, all of these telephones used transmitting circuits that generated, either wholly or in part, an alternating current. There is but one exception to this and that is the circuit shown in Figure 1, which was discarded almost universally on account of its low receiving properties. The distinction between a transmitting device, which sent out pulsating or direct current, and one that sent out alternating current, should be borne in mind while reading the discussion of the development of circuits.

It was recognized by all progressive telephone engineers that the common battery switchboard would play a very important part in the development of the art of telephony. It is true that a number of the more conservative engineers took the stand that it was impossible to get as good transmission, with battery fed by a central exchange several miles distant from the telephone, as it was with primary cells located in the telephone itself.

While they admitted that the ease of signaling and the certainty of signaling, together with the compactness of the new type of board, made it indispensable in the larger exchanges, many of the engineers held, with some justice, that the telephone should furnish its own battery for the talking currents. This led to what was at that time a popular system and one that was for some time a formidable rival of the straight common battery switchboard, namely, a common battery signaling local battery talking system.

However, as common battery systems were brought into more general use, it was found that although a local battery telephone at a distance of several miles from the exchange would talk better than a common battery telephone at the same distance from the exchange, yet as a matter of fact the average telephone in a common battery exchange talked better than the average telephone in a local battery exchange.

In the first place the common battery telephone that was not too far from the central exchange talked practically as well as the local battery telephone.

In the second place, although the local battery telephone had theoretical advantages when located at a distance from the exchange, this advantage was more than offset by the fact that dry cells soon lost their efficiency, so that a local battery telephone which might talk better than a common battery instrument for the first two months that the batteries were in service, would not talk as well as the common battery telephone for the next six or eight months that the batteries were in service.

In short, the working or commercial efficiency of the common battery telephones was found to be greater than of the local battery telephones. In later years it was also found that by increasing the voltage of the central office battery, telephones at a distance from the exchange could be made to give practically as good transmission as those adjacent to the exchange.

The new telephone using battery from a distant source, naturally called for a different design of circuits in the telephone itself. Considering the other developments in the telephone field, it is remarkable how few working circuits have been designed for common battery telephones.

One of the most interesting circuits to the engineer is that invented by C. E. Scribner wherein a small storage battery was placed in each telephone. The current from the distant exchange was charging the storage battery of the telephone whenever the receiver was upon the switch hook, so that the battery was always fully charged. This was expected to give all the advantages of local battery talking, without the disadvantages of the inevitable falling off in current of primary batteries. There were, however, commercial difficulties in the way of this circuit, and although it was used in the Oakland exchange, Chicago, for a number of years, it was finally discarded in favor of the full common battery circuit.

It is almost unnecessary to point out the difficulties experienced, namely, the supplying of the individual cells with water for electrolite, and possibilities of ruining furniture or rugs from spilling the solution, and all of the faults to which storage batteries are subject.

It is the purpose of this article to treat of the circuits that have been used commercially, rather than those that have been merely experimental and have been discarded. Scribner's circuit was mentioned only as an interesting step between the development of the full common battery circuit and the old local battery circuit.

Probably the oldest circuit in use is the one shown in Figure 1. In this the transmitter battery flows through the winding *a* of the induction coil to furnish the talking power. The talking qualities of the circuit depend entirely upon the change of resistance of the total subscriber's loop by the variation of the transmitter resistance. Although the impedance of the winding *a* of the induction coil is considerably reduced by the short circuiting of the secondary *b* through the receiver *f*, yet the talking qualities of this circuit are rather poor, and it has not been used extensively in late years. The receiving qualities of the circuit depend entirely upon the transformer action of the coil and, as the induction coil is a very inefficient transformer, the receiving qualities of this circuit are decidedly below par.

The second circuit in point of age, and one which is used exclusively by the Bell company at the present time, is what is known as the Hayes condenser circuit and is shown in Figure 2. This circuit is a great improvement on that shown in Figure 1 in that the condenser acts as a source of stored up energy to take up or give out current upon the variation of the transmitter resistance.

If the resistance of the transmitter *d* is lowered the potential across the condenser is higher than across the transmitter, and the condenser discharges through the receiver, transmitter and winding *b* of the induction coil. This discharged current is transformed by the induction coil and sent out over the line. If the two windings of the induction coil are properly connected this impulse of current sent out builds up the impulse of current due to the change in the total loop resistance by the lowering of the resistance of the transmitter *d*.

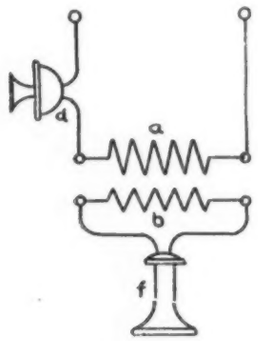


Figure 1.

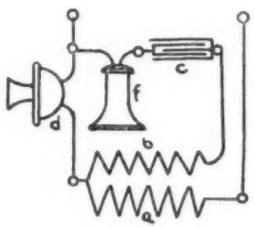


Figure 2.

This circuit has proven to be an extremely well designed circuit as far as talking qualities are concerned. However, in receiving qualities the circuit is poor. The action is the same as the Figure 1 circuit, being entirely dependent upon the transformer action of the induction coil, but we have a condenser in series with the transformer circuit, so that there is a slight loss in receiving qualities in this circuit as compared to the first circuit.

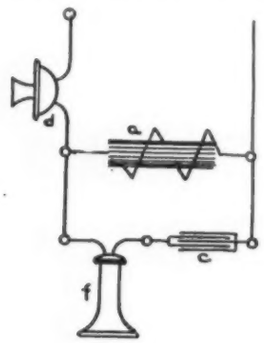


Figure 3.

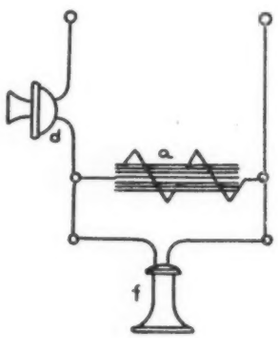


Figure 3a.

The next circuit to be taken up is what is known as the impedence coil circuit. This has been used in several forms which will be taken up in turn. The first or oldest form is shown in Figure 3. In this an impedance coil is placed in series with the transmitter and the line. The receiver in series with a condenser is bridged across the impedance coil. The talking qualities depend mainly upon the variation of the total loop resistance by the variation of the transmitter *d*, but there are some slight advantages gained by the action of the condenser *c*, so that this circuit talks slightly better than the one shown in Figure 1, but not nearly so well as the one shown in Figure 2.

As a receiving circuit this circuit has many points of advantages and also of disadvantages. The theory is that the voice currents will be shunted into the receiver on account of the high impedance that the impedance coil offers. However, the actual working results are that a considerable portion of the voice currents pass through the impedance coil and are entirely lost. In spite of this disadvantage, however, the circuit receives better than either circuit 1 or 2.

The first variation of this circuit was in the leaving out of the condenser (Figure 3-a). The resistance of the impedance coil had usually been twenty to twenty-five ohms. This resistance would cause a drop of several volts across the receiver, and it was found that this was sufficient to either depolarize the receiver magnets, in case the current was flowing in one direction, or have a tendency to buckle the diaphragm in case the current was flowing in the other direction.

It was found that it was possible to build an impedance coil of only a few ohms resistance that would have practically the same impedance as the twenty-five ohm coil. This, of course, would decrease the potential across the receiver and, therefore, decrease the tendency to demagnetize the receiver or buckle the diaphragm, as the case might be. This circuit, however, has never been popular, as it is not considered good practice to allow any tendency to demagnetize receivers in actual practice.

The second variation of the impedance coil circuit is what is known as the bridge circuit. This is shown in Figure 4. In order to keep the current out of the receiver, advantage is taken of the Wheatstone bridge principle. The proportion of the ohmic resistance of the coils *a, b, c* and *e* is such that there is no difference of potential on the terminals of the receiver, hence, there is no current tending to either demagnetize or buckle the diaphragm. Voice currents, however, are shunted by the impedance coils *a* and *b* through the non-inductive coils *c* and *e* and through the receiver.

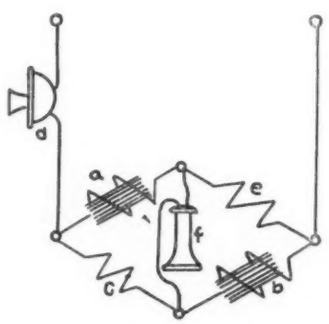


Figure 4.

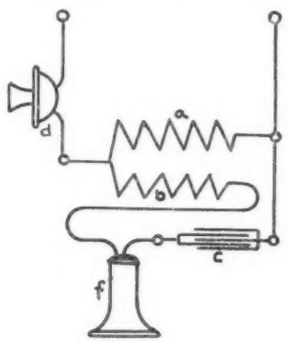


Figure 5.

The talking properties of this circuit are not quite so good as the original impedance coil circuit, as the slight benefit gained from the condenser in that circuit is not present in the bridge circuit. The receiving qualities are probably a little better in this circuit, as the resistance of the non-induction coils *c* and *e* to talking currents are said to be less than the resistance of the condenser. This is especially true if anything less than a two micro-farad condenser is used in the impedance coil circuit.

A later circuit, and one which has been used by two or three Independent manufacturing companies with very good results, is shown in Figure 5. This is in principle a combination of circuits 2 and 3. Transmitter battery is fed through the winding *a* of the inductive coil. However, the talking qualities do not depend entirely upon the variation of the resistance of the transmitter *d*, but we have a condenser effect through the winding *b* of the induction coil operating somewhat like that in Figure 2. The talking qualities of this circuit are about equal to that of the Hayes condenser circuit shown in Figure 2.

The receiving qualities of the circuit, when the coil is correctly designed, is greatly superior to that of any of the other circuits yet shown. As the impedance of the winding

b is very low, we have all the advantages of Figure 3 in shunting voice currents into the receiver by means of the impedence of the winding *a*. The main point of superiority in the circuit lies in the fact that the currents, which in Figure 3 are lost entirely through the impedance coil *a*, are in Figure 5 transformed when they pass through the winding *a* to the winding *b*, and are thus picked up by the receiver. This circuit appears to be as good in talking properties as any of the other circuits discussed and considerably better in receiving qualities.

It is interesting to note that in all of these circuits there is no attempt to step up the voltage of the talking current. It is true that in the last circuit mentioned, there is a portion of the current that is stepped up in voltage. However, this is incidental and comes about merely through the design of the induction coil to obtain low impedence in winding *b*. It was recognized early in the history of these circuits that the voltage available on common battery lines was sufficient for 100 per cent transmission.

It is also interesting to note that all of the circuits are

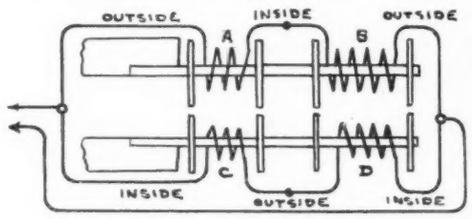


Figure 6.

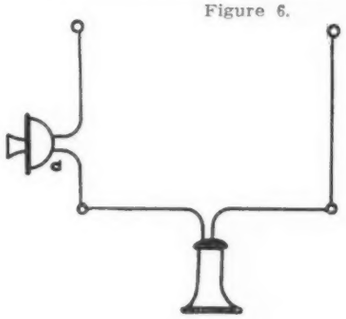


Figure 7.

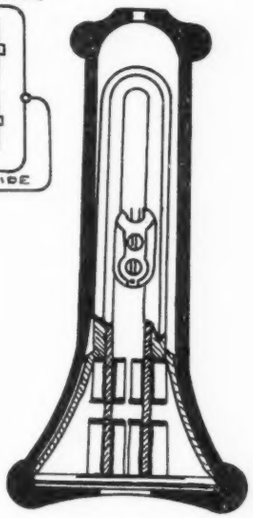


Figure 8.

designed with the one thing in view, that is, to keep current from demagnetizing the receiver or from buckling the diaphragm of the receiver. It is also interesting to note that in one modification of the impedance coil circuit the demagnetizing effect of the direct current was reduced to a minimum, yet the fact that there was a demagnetizing effect was sufficient to keep the current, which was obviously simple and efficient, from being used to any commercial extent.

It would seem then from studying the work of the best designers in the telephone field in past years, that the one important thing in the design of common battery circuits is to keep the direct battery current out of the receiver.

In all of the methods discussed there has been a sacrifice of efficiency in talking and receiving properties in order to accomplish this result. This has been either in the loss of current through the inefficiency of the induction coil as a transformer, or in the loss of current through the impedance coil.

There has been a circuit designed and put upon the market recently that has attained the purpose of preventing the receiver from being demagnetized in an entirely new manner, and in a manner that eliminates all losses of talking current.

Attention is here called to the fact that this circuit is the first circuit to be designed for the purpose of utilizing direct or pulsating currents for transmission as well as preventing the receiver from being demagnetized in an entirely novel manner. It is interesting to look back, in view of the development of this later circuit, and notice that for years the engineers have all attempted to accomplish the end of preventing the receiver from being demagnetized by means outside the receiver itself.

The question that will be asked now that this new circuit is introduced, is why engineers have not before taken up the question of so designing the receiver that it would not be demagnetized by direct current, although exposed directly to this current.

The new circuit, which is shown in Figures No. 6 and 7, is new only in the design of the receiver itself. The circuit consists of nothing but a transmitter, and receiver in series, and the novel features lie in the design of the receiver.

It will be noted that in place of the ordinary pair of receiver coils employed, there are four coils on the receiver. The coils *A* and *B* are in series, as are also the coils *C* and *D* and the two groups are in parallel. The coils *B* and *D* are actuating coils, while the coils *A* and *C* are designed to prevent the demagnetization of the receiver or the buckling of the receiver diaphragm. Coils *B* and *D* are wound in the ordinary manner and act upon the receiver diaphragm in the same manner as in the ordinary receivers. The coils *A* and *C* are wound in opposition to the coils *B* and *D* respectively, and their action is to oppose magnetism set up by the direct current in the coils *B* and *D*.

The magnetism produced by the transmitter battery flowing through the coil *B* is neutralized by that produced by this same current in coil *A*. The same is true in coils *C* and *D*, and it is evident that as the coils *A* and *B* and *C* and *D* respectively are in series, the effect of this transmitter current will be neutralized, no matter what the length of the line may be. The two groups are placed in parallel merely to reduce the ohmic resistance of the entire receiver, so that the transmitter will get its full current.

It is evident that if the coils *A* and *C* are made in the same manner as coils *B* and *D*, they would oppose not only the magnetism produced in coils *B* and *D* by direct current, but also that produced by the talking currents, and would thus reduce greatly the efficiency of the receiver. To obviate this, the coils *A* and *C* have a copper sheath over the core and copper heads on the spool. In actual practice the head and sheath are in one piece of copper.

The effect of a copper sheath around a core is well known. It kills the action of the coil, due to any alternating currents of high frequency. It also reduces the impedance of these coils to alternating current.

It is evident then that with a receiver of this design we have a perfectly balanced receiver as far as direct current is concerned, and that in respect to the voice currents we have a receiver in which the action of the primary coils *B* and *D* is the same as an ordinary receiver, and the action of coils *A* and *C* is absolutely killed, not only as regards magnetic action, but also in regard to impedance. We have then in this circuit actuating coils *B* and *D* in series with non-inductive resistance *A* and *C* and these resistances *A* and *C* are in parallel. As this resistance is low and is non-inductive, there is no effect from this resistance on the talking current.

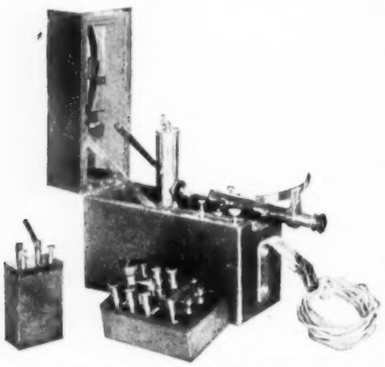
Such a circuit gives full battery to the transmitter and allows full variation of the total loop resistance by the variation in the resistance of the transmitter *d*. This variation is greater than in any of the other circuits discussed, on account of the low impedance of the receiver as compared with either the induction coil or the impedance coil, hence, the talking qualities of this circuit are better than of any other circuits discussed. In receiving qualities the advantage gained is even greater. All of the voice currents received at the sub-station pass directly through the receiver without any loss through induction coil or impedance coil, and without any retarding effect of impedance coils or condensers.

It is believed that the design of this receiver, a working drawing of which is shown in Figure 8, or circuit, whichever way it may be classed, is an important step in common battery practice. It is unquestionably the first important

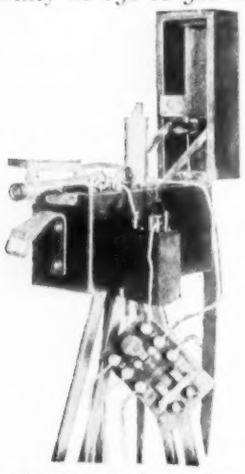
change in the receiver in ten or fifteen years and, combining as it does increased efficiency in transmission and in receiving, with greater simplicity of circuits, and with a considerable reduction in cost, it is stated by its manufacturers, the Vote-Berger Company of La Crosse, Wis., that this circuit will exert tremendous influence on common battery apparatus of the future.

A NEW UNIVERSAL GALVANOMETER.

ALL the advantages of the pivoted form and the added sensibility of a suspended instrument are combined, it is said, in the Queen universal galvanometer just produced. The permanent magnets are made from the finest quality of magnet steel, carefully aged to insure permanency. The moving coil in a uniform magnetic field and the deflections are proportioned to the flow of current. With proper shunts this instrument can be used as an ammeter or a milliammeter, and with a series resistance can be used as a voltmeter or a milli-voltmeter. In view of its many uses and of the fact that it is available as a table, wall or tripod galvanometer, it may well be called a universal type. As a galvanometer proper, it has a variety of uses having ordinarily a sensibility of 150 to 500 megohms, and is made up to 1,000 megohms sensibility. The coils are rectangular in form and swing over a soft iron core having radial faces. The moving system is suspended by phosphor bronze strips secured to abutments terminating at the ends of two steel rods that also hold the soft iron core over which slides the clamping device for transportation. A three-eighths plain mirror is mounted just above the coil. The upper abutment is provided with two milled heads, one for locking the system and the other to adjust zero. The whole is enclosed in a brass tube provided with a three-fourths circular window. The entire system can be lifted from the tube by the removal of two small screws. The tubes with system are interchangeable. This will enable the user to have tubes of different sensibilities.



Queen universal galvanometer.



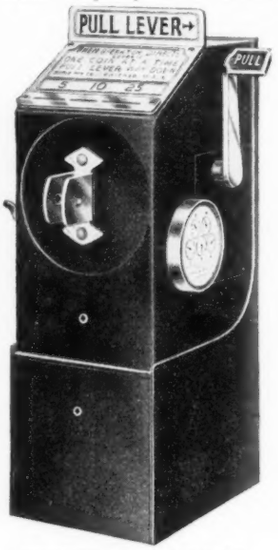
Showing moving system.

The containing cases are made of hardwood, well finished and provided with a leather carrying strap. The permanent magnet is securely bolted in the case, thereby insuring extra stability.

A telescope and scale is also attached to the magnet, as well as curved soft iron pole pieces that form a receptacle for the tube and system. On either side of the telescope is provided a mill-head screw for leveling when used as a table galvanometer. There is also provided a brass plate secured to the lid of the instrument, so that it can be used as a wall galvanometer. This instrument has also a brass plate on the bottom with a hole tapped to receive the screw from a tripod for street work. With this instrument is a 100,000 ohms coil wound with a wire having a negligible temperature coefficient, mounted in a neat case with suitable terminals. There is also an Ayrton shunt with all necessary binding posts and two battery reversing keys. These instruments all fit in the box very compactly and the entire dimensions over all are 6½" high, 8½" long and 3½" wide, weighing 5½ lbs. The Queen Universal Galvanometer is manufactured by Queen & Company, Philadelphia.

MEASURED SERVICE EQUIPMENT.

THE growing demand for telephone service has made necessary the development of instruments for handling calls rapidly and efficiently. Any method of recording calls which drags the service, or has not the confidence of the patrons, is but a makeshift.



Prepayment pay station.

In rapid action apparatus the Baird Manufacturing Company offers in our advertising pages a line of new equipment, including its "Rapid Fire" meter, which is located at the subscriber's telephone, where he makes his own record.

Another new piece of Baird apparatus is the prepayment station, which enables the operator to collect in advance for local calls. This machine is a standard Baird pay station with the addition of a relay and suspense hopper. It is said to be free from complications and of low maintenance. In developing its new code of numerical signals for pay stations, the Baird Manufacturing Company has, it claims, at the same time solved the cash register problem, as the only addition necessary is a standard counter and a toothed lever on the coin, operated shaft of the machine. The same mechanical action which gives the numerical signal calls of one gong stroke for a nickel, two for a dime and five for a quarter, moves the counter one space for a nickel, two for a dime and five for a quarter. The record therefore is made in multiples of nickels. For detailed information regarding any of these new pieces of apparatus, write the Baird Manufacturing Company, 1600 No. Halsted street, Chicago.

THE STACKPOLE BATTERY.

THE Stackpole Battery Company of St. Marys, Pennsylvania, has forged rapidly to the front with its products, and its success has been particularly marked with the "Hello" telephone cell.

Although this concern is but little over a year and a half old, it has obtained many large contracts from Independent telephone companies. It is said that the company's plant is thoroughly up-to-date as to construction and equipment and is backed by ample capital. Besides an extensive output of dry cells, the company manufactures wet cells and various carbon products.

For the current season, the Stackpole Battery Company has arranged to concentrate the greater part of its facilities and energies upon the telephone field. The company firmly believes that it has in the "Hello" battery the best dry cell on the market, and it is resolved to make every telephone man acquainted with its merits and economy. A branch has been established in charge of F. J. Alvin at 233 E. Randolph street, Chicago. All inquiries and orders addressed there will receive prompt attention.

THE MOORE CALENDAR FOR MARCH.

THE handsome picture calendars of Alfred F. Moore, Philadelphia, are creating a pronounced hit with the telephone trade and are being eagerly sought for, causing the demand to already exceed the supply. The calendar study for March, besides being exceedingly appropriate, is one of the most artistic of the year. Alfred Moore believes in good publicity and accompanying each of his March calendars is an interesting talk as follows:

"Nearly everybody is beginning to figure up what work can be accomplished outside during the coming summer.

"Incidentally, of course, more or less wire will be required. We manufacture and carry in stock weatherproof, copper and iron wire for line work; rubber covered and braided twisted pair No. 14 and No. 16 for drop wiring, and braided and twisted rubber covered wires for inside work in all the standard colors.

"Why not go over your stock now and make up a list of what is needed? You will then be ready to start work on a moment's notice. Take advantage of the occasion to order some cords also. They will be needed before you know it and then somebody will wonder why the stock was not looked after in time."

WHAT IS A PAY STATION GOOD FOR?

MOST every one seems to know, but the main thing to know is, which pay station is the best, most practical and serviceable one to purchase. There are many on the market which do different things in different ways. Some have cast iron and some stamped steel cases, having slots in which to place the different denominations of coin and a series of bells, gongs or tickers to notify the operator of the denomination of coins deposited. Some are provided with recording devices in the form of a counting machine or gas meter from which a copy is made by the collector at the time collections are made, this copy to be taken to the auditor with the money.

There is one other make which, it is claimed, does more than any of the rest. This machine has a stamped steel case, and a separate cash department with separate key. Only one gong for signals, which is very loud and clear. Signals are given in units of 5, every ring of the gong meaning 5 cents. One ring for five cents, two rings for 10 cents, five rings for 25 cents, eight rings for 40 cents and so on. They do not use one ring for 5 cents, two rings for 10 cents and three rings for 25 cents, as three rings would also mean a 15 cent deposit. The chute is protected in such a manner as to insure but one coin at a time being deposited. The operator can not err, it is said, in this signal system, all she has to do is to count.

The most valuable feature of this apparatus is the absolutely new recording tape which is said to be perfect and the only true record, showing every deposit according to its denomination for which is issued a cash ticket at the time each collection is made. This cash ticket is mechanically made, cannot be altered, and will at all times, it is said, account for all money collected, thereby preventing pilfering. This feature is very valuable to every telephone company, not only in cities, where dishonest collectors are found, but in the country as well. It is designed to prevent errors and lessens expense in office work.

A party, who operates a plant in a town of 4,500, having connecting lines in smaller neighboring towns, where he has pay stations, says that in the past he made the collections by driving at an expense once a month, but now has the money and ticket collected and sent to him by mail, so that he has paid for his station in six months' time. The cash ticket being his record, guaranteeing the amount of money collected.

Unless a pay station is a money-maker, it is not wanted, but the best is the cheapest in the long run and the United States recording pay station company claims that its apparatus is as essential to the telephone trade as a cash register is to a merchant. It is advertised as "the only one making a cash ticket."

The company's new factory enables it to fill orders promptly and supply any demand. For catalogues and particulars address the United States Coin Register Company, Toledo, Ohio.

A "SNAP" FOR THE WIRE CHIEFS.

THE Jewel Milammeter, manufactured by the Jewell Electrical Instrument Company, Chicago, is said to be especially desirable for wire chiefs' use. It is of convenient form and weight, portable, of black finish, adjustable dial and supportable movement. It shows both volts and milamperes and lists at $15, which is a substantial reduction for a standard instrument. Mr. Jewell guarantees this milammeter to be fully as reliable as any instrument heretofore offered at $35 to $45.

MR. E. L. KLINGEL.

ON account of the large number of regular customers in the state of Ohio, the Dean Electric Company found that two men would be needed to properly cover the territory. Mr. E. L. Klingel was engaged as the new man and a widely diversified experience should assist him in aboundantly "making good."

E. L. Klingel "Dean" salesman.

Mr. Klingel started in the telephone business as lineman for the Central Union Telephone Company, first at Edwardsville and then at DeKalb, Ill. He showed such proficiency that at the age of eighteen he was appointed manager at Vandalia, where he doubled the size of the plant in a year and a half.

Having succeeded with an old magneto exchange, he was assigned the managership of the large central energy plant at Mt. Vernon, Ill. This position he held until 1906, when his responsibilities were further enlarged, the Kavanaugh

Telephone Company engaging him to manage its exchange at Effingham, Shumway and Beecher City, Ill.

His work in this capacity attracted the attention of one of the "Dean" salesmen, and his present assignment to Ohio territory gives promise of excellent results. Like all "Dean" salesmen, he is a thorough telephone man, and this quality alone, should commend him to the trade.

IMPROVED DETAILS OF "BSCO" TELEPHONE BATTERY.

THE January issue of TELEPHONY, mentioning the "BSCO" telephone battery, pointed out certain electrical advantages of this cell for transmitter work and for operating pole changers. There also exist mechanical features of this cell which in part bring about the desirable

"BSCO" battery, dis-assembled.

electrical features mentioned. The "BSCO" battery is distinguished from all other cells of the copper-oxide or caustic-soda type by the fact that the renewal elements are shipped from the factory already assembled in the hanger, and only need be attached to the cover of the cell by drawing up one thumb screw before insertion in the cell. There is only one wire to be connected to the next cell, instead of two, as found on nearly all other batteries. In the older types of caustic-soda batteries, the zincs were suspended from the cover separately and the copper-oxide plates were held in permanent holders. In order to renew the old cell it was therefore necessary to handle those parts, dripping with solution, and to scrape and clean the holder before the new plates could be inserted. In the new "BSCO" cell, the old elements, holder and all, are allowed to drop from the cover and are discarded without being touched. An assembled set of elements and also a set of elements attached to the cover, together with the other materials for a "renewal," are shown in the accompanying illustrations. The other materials just mentioned are a can of caustic soda (just sufficient for one cell)and a bottle of oil.

In the process of renewal, the cell is first disconnected, then the covers are removed, after which, by unfastening the large thumb nut, the old elements are allowed to drop to the ground. The old solution is then poured out of the jar, which is refilled with clean water. After cutting out the bottom of the soda can with a pen knife, the contents are poured slowly into the water. The new set of elements are then attached to the cover and inserted in the solution, after which the contents of the bottle of oil are poured over the surface of the solution. The cell is now in every way "as good as new," and is capable of delivering over 350 ampere hours at a cost of only $1.60.

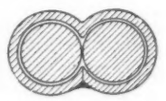
The fact that the elements are furnished, already assembled, are claimed to reduce the labor and time spent in renewal and thereby improve the electrical action of the cell in the following ways: Since the copper-oxide and zinc plates are fastened rigidly and definitely together, it is possible to place them closer to one another in the solution without danger of short circuiting, thereby greatly reducing internal resistance and effecting a corresponding increase in the available electro-motive force and in productive capacity. In the old style of cells, the zinc would sometimes be loosely attached to the cover so that it would strike against the copper plates, resulting in short circuiting, or on the other hand it would spread so far away as greatly to increase the internal resistance. Also in the old style of cells, the zincs were suspended from above the solution and were sometimes eaten off at the level of the solution. In the new "BSCO" cell this is entirely eliminated by supporting them from below the solution. Other advantages over other types of wet cells are that there is no trouble from the breaking of supporting frames, no cleaning of frames or perforated copper oxide containers to be neglected, no parts to be mislaid or lost, no thin-threaded bolts to break or strip the thread, no hard-rubber insulators to be overlooked, no breakage of the copper oxide plates in shipment, and no sifting of powdered copper oxide, which in some types of cells occasionally causes internal short circuits.

The "BSCO" battery is being widely introduced in large telephone exchanges and the manufacturers, The Battery Supplies Company, Newark, N. J., will, we understand, send cells for inspection and test to managers of telephone companies. They also have several booklets and other literature which will doubtless be of interest to those who use batteries of any kind which will gladly be sent upon request.

AMERICAN JUNIOR JOINTS.

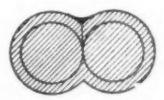
THE American Electric Fuse Company, Muskegon, Michigan, has gotten out an improvement in wire connectors or joints called the American Junior joint, of which the illustrations show the general design. There are new points and ideas of manufacture in this connector that the company claims make a better joint than any other connector and as nearly perfect as possible, and shows no resistance when inserted in the line and after it is twisted. It is mechanically strong and will not give way or break with less strain than it takes to break the wires themeslves.

American junior joint.



Cross section American junior joint.

American junior joint twisted.



Cross section American junior joint twisted.

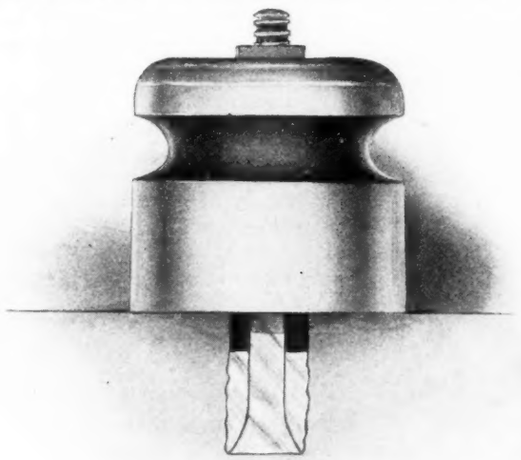
In the American Junior joint the wires are brought into direct contact with each other, and during operation of twisting are entirely enclosed within an airtight covering made by the joint itself. The joint stretches tightly about the wires and a perfect electrical connection is established, which is guarded from corrosion or moisture by the close fitting walls of the joint. It is made from pure, flexible, soft copper, and when twisted upon the wires, the splice be-

comes so welded together as to constitute practically one solid mass.

The American Junior is claimed to be the only joint in which a direct connection is made between the wires themselves within an airtight covering which prevents corrosion. Samples or printed matter would be gladly sent and a postal will bring them.

PEIRCE EXPANSION BOLT AND PORCELAIN KNOB.

FOR those who use twisted pair drop wires, we show herewith an interesting and economical method of attachment to brick and stone houses, made by the Peirce Specialty Company, of Elkhart, Indiana. It consists of a



Peirce expansion bolt and porcelain knob.

standard No. 4 porcelain knob and the well known Peirce Expansion Bolt in size ¼ x 3¼.

The company claims that this form of support can never be pulled off; that there is no danger of breaking the porcelain knob and that it takes less time to put up a drop, using this method.

TORNQUIST NEW KING OF PROTECTORS NO. 45.

THE Tornquist Electrical Manufacturing Company, Moline, Ill., claims that its new "King of Protectors, No. 45," is a sure protection against lightning for telephones and private telephone lines.

The device is so arranged as to entirely disconnect the line from the instrument, save the telephone and the fuse, and at the same time not interfere with the working of any other instrument on the same line. On the approach of a thunder storm the switch lever is thrown open, which entirely disconnects the line from the instrument. When the switch lever is thus operated, injury to the instrument is said to be absolutely impossible. Samples and prices will be furnished upon request.

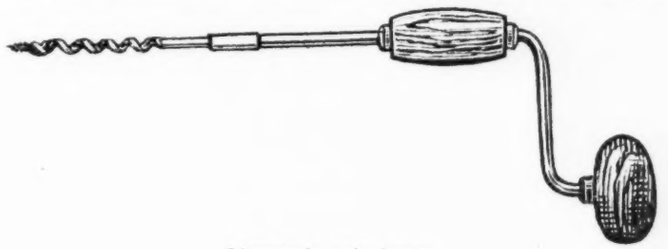
ANOTHER CUSTOMER SATISFIED.

THE Duluth Log Company appears to receive its full share of orders. Being located at the head of its operations and in close touch with all of its cedar yards, this company is exceptionally well equipped to fill orders promptly. On Saturday, January 18th, late in the afternoon, the company received a telegraphic order for two carloads of poles required for emergency use. Cars were set in Duluth Yard No. 2, loaded and switched out by 2 o'clock Monday, and departed by fast freight the same evening. Arriving at Minnesota Transfer the following morning, they passed through the Transfer, where shipments are so frequently held up for indefinite periods, in less than twelve hours and were forwarded to the next junction point, passing Chicago, January 25th, and arrived at their destination, a point about 300 miles beyond Chicago, two days later, having moved from point of origin to final destination in seven days.

The business of this company has increased wonderfully on account of the advantageous location of its various shipping points and the service it is able to give.

LINEMEN'S POLE BRACE.

H. S. POWELL, Utica, N. Y., has recently placed upon the market a pole brace which is intended for boring holes in the tops of poles after they have been set. In operating this brace, the left hand grasps the center knob and steadies it, while the center or crank knob is turned with the



Linemen's pole brace.

right hand, thus making it easy to bore holes, as the lineman is not obliged to lean from the pole. Mr. Powell will guarantee the quality of his braces and is in a position to furnish descriptive circular matter to all interested parties.

TRADE NOTES.

THE HARVARD ELECTRIC COMPANY, 66 West Van Buren street, Chicago, Illinois, announces the Harvard self-welding wire joint. Full information concerning this device will be furnished by the company upon request.

GEORGE R. BLACKBURN, Cleveland, Ohio, is issuing to the trade a series of illustrated calendar cards, descriptive of the Blackburn Ground Clamp, which will be sent to all interested parties upon mentioning TELEPHONY.

FRANCIS A. MCINTOSH has resigned the position of advertising manager for the Norton Grinding Company, Worcester, Mass., to assume charge of the Public Works of the Buffalo Forge and Steam Pump companies of Buffalo, New York.

THE COLMAN J. MULLIN COMPANY, 430 Kent avenue, Brooklyn, New York, has recently issued a circular, descriptive of its perfection furnace protector which, with prices and samples, will be submitted to all interested parties upon request.

JOHN A. ROEBLING'S SONS COMPANY, Trenton, New York, reports that while one of its several wire shops was recently destroyed by fire, preparations for rebuilding the shop already have commenced, and no trouble is anticipated in fully meeting the demand for wire rope.

THE AMERICAN CONDUIT COMPANY, 140 Nassau street, New York, has recently issued its bulletin No. 241, illustrating the laying of bituminized fibre conduits. The company makes a specialty of underground construction and is prepared to furnish any information upon request.

AT THE ANNUAL MEETING of the Dean Electric Company, held at Elyria, O., on February 10, the usual dividend of 7 per cent on the preferred stock was declared. Mr. A. E. Barker has recently left the Dean company to become vice-president and general manager of the New Home Telephone

Company, at Detroit, but will retain his interest in the Dean company as well as his title of second vice president.

THE FRED'K PEARCE COMPANY, of 18-20 Rose street, New York, has ready for distribution to the trade its latest catalogue No. 60, relating to induction and X-ray coils, high frequency apparatus, accessories and supplies. Copies of the new catalogue may be secured by mentioning TELEPHONY.

THE MASSACHUSETTS CHEMICAL COMPANY, Walpole, Massachusetts, reports an increase in the sales of its No. 15 oil proof transformer cement. This is a yellow cement of great strength and high melting power and is used extensively for insulating transformers. It resists hot or cold oil, and is applied, when melted in a ladle.

THE DAVIDSON-GALLMEYER LUMBER COMPANY, succeeding the Davidson Lumber Company, has opened new offices at 1044 and 1045 Ohio building, Toledo, O., where it will be pleased to meet its old customers, or any other telephone man interested in the purchase of poles. Inquiries by mail will receive prompt attention.

THE WM. J. MURDOCK & COMPANY, Chelsea, Mass., has prepared an interesting circular descriptive of its solid telephone receivers. The company's receivers, it is said, are extremely efficient, sensitive and will work on any service. The magnet, binding posts and all metal parts are moulded into case, making one solid piece. This construction affords a fine working receiver under all conditions, as the adjustment can not change nor any of the parts loosen from their position.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, New York, and Chicago, Illinois, has recently issued to the trade several post cards, descriptive of its quality switchboard, "ring thru" coil cords and flux solder. A four-page circular is being prepared for mailing, describing its new No. 8 drop and 150-line switchboard. The company will be pleased to furnish full information concerning its specialties and will furnish all interested parties with its new circulars upon request.

MR. H. P. COPELAND, 203 Broadway, New York, with twelve years of experience as manager of the electrical department of James S. Barron & Company, announces the opening of new quarters of his own. Mr. Copeland will handle specialties in wood and in sheet metal for telephone and telegraph construction and maintenance, and will conduct agencies for the sale of Glitterene, two-hole telegraph blocks, wood battens, wood wiring cleats and Ebonite; also manufacture the "H.-P.-Restless" cable hanger.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Illinois, reports that it is enjoying an unusual switchboard business. This company has many exclusive and original features in its central office equipment that instantly appeals to telephone men, the removable coil feature, the duplex wound clearing out drop feature and others that the company will be glad to give full details to those interested. Among the companies which have placed orders for switchboards and telephones with the Swedish-American company recently are: Wakarusa Home Tel. Co., Wakarusa, Ind., 200 line board and toll line equipment; Eden Mut. Tel. Co., Schaller, Iowa, 200 line; Slayton Tel. Co., Slayton, Minn., 100 line; Prescott Tel. Co., Prescott, Kans., 100 line; Home Tel. Co., Arnet, Okla., 100 line; Brooklyn Tel. Co., Brooklyn, Ind., 100 line; Portland Mut. Tel. Co., Watson, Ohio, 100 line; Farmers' Mut. Tel. Co., Morrison, Ill., 200 line; New Tel. Co., Kinmundy, Ill., 100 line; Peoples Tel. Co., Blunt, S. Dak., 100 line; Davis Tel. Co., Linn, Mo., 100 line; Lagro Tel. Co., Andrews, Ind., 100 line; Henley Tel. Co., Henley, Mo., 100 line; Robinson Mut. Tel. Co., Robinson, Kans., 200 line; Peoples Tel. Co., Lime Ridge, Wis., 100 line; Local Tel. Co., Canaan, Ind., 100 line; Green Robinson Tel. Co., Cottonwood, Tex., 100 line; Latah Tel. Co., Latah, Wash., 100 line; Garn Tel. Co., Funk, Ohio, 100 line; Equity Tel. Co., Mayfield, Ky., 100 line; Athens Tel. Co., Athens, W. Va., 100 line.

GEORGE T. WESTCOTT, 315 Chamber of Commerce building, Chicago, has been appointed Western representative for the Ellwood Ivins Tube Works, which recently added to its regular line of tubing of all kinds, a line of sheet and wire made of the baser metals and coated with platinum of any required thickness. The telephone manufacturers at once took advantage of this product, as it stood so much more manipulation without the coating separating from the baser metal than anything theretofore put upon the market. In fact, it was practically impossible to separate it. As a transmitter electrode, it was quickly adopted, as well as for contacts of all kinds. The company has recently added to its line rivets made of copper, German silver, or other metals with a platinum coating on the head or point, or both. This proved just the thing needed to make the line complete, and it was immediately taken up for rivet contact work. Mr. Westcott will gladly go into details with any one so desiring.

TYPE "E" SWITCHBOARD VOLT AND AMMETERS.

THE Type "E" switchboard meter manufactured by the Robert Instrument Company, Detroit, Michigan, is claimed to be most desirable when an accurate, and yet inexpensive instrument can be used. These instruments are said to be accurately calibrated and to have a distinctly drawn scale. The meter is of very handsome design and finish; the base is a casting and the shell is of brushed brass with beveled flange. These instruments are especially desirable for use on switchboards for storage battery charging and were designed, it is said, to meet the demand for high grade instruments at a low price.

The Robert Instrument Company has recently issued a catalogue descriptive of its measuring instruments, and of their numerous and varied applications.

THE PARTY LINE TELEPHONE.

THE telephone solicitor referred to by an exchange in the following was "on to his job" and a judge of human nature as well:

"Do I want a 'party line'?" snapped Mrs. Harker, with much emphasis. "No, indeed! Why, the idea! I wouldn't think of having one."

"Don't blame you, madam," replied the telephone solicitor, with a sly wink at the milkman. "Party lines are very embarrassing. When you go to the telephone to call up some one you are likely to hear Mrs. A. telling Mrs. B. all the latest gossip of the neighborhood. Then you will hear the butcher telling Mrs. Z. how much she owes and what he is going to do if she doesn't pay him."

"Gracious!"

"Not only that, but you can hear just what Miss K. says to her beau during lunch hour and what old man Smith is telling the pretty widow down in the apartment house and —but what is the use of wasting time? You don't want a party line. They are too embarrassing. Good-day, madam, I——"

But Mrs. Harker had him by the arm.

"Come right back," she said, firmly, "and take my order for a party line. What if it is embarrassing? We all have to stand embarrassments sometimes."

THE BUSINESS END OF THE BUSINESS

A Paper Read Before the International Telephone Convention at Chicago

By J. H. Shoemaker

ON THE 10th of June I read a paper at the South Dakota state convention on "Profits" in which I endeavored to bring out some of the same points that are attempted in this effort. I make this explanation in order to set myself right with those who might wonder at certain repetitions, the reasons for which they would not otherwise understand.

If I correctly comprehend this subject, the business end of every undertaking is: "Behind, as its pusher; below, as its booster; at the right side, as its director; at the wrong side, as its corrector; inside, for its details and discipline; outside, for its defense and diplomacy; in front, as its leader, and above, as its master."

This is merely another way of repeating what we learned in school, where we were told that the whole of anything is greater than any of its parts; and it serves to introduce our thought that in the consideration of this subject we should first search out the position from which we may, at a single glance, obtain the best view and the most comprehensive grasp that can be obtained of our business; not in its own entirety merely, but including also its relationship to all other undertakings.

It is said that a painter invited his friends to his studio to admire a picture of a cat, and when the painting was shown them the guests began to inquire for the cat, which they could not see. After permitting them to say that they could see sky and sea, mountain and plain, rivers and trees, animals, birds and flowers, but no cat, the painter explained that cloud and mountain, sea and river were but the lights and shadows, the ears, eyes, head, feet, and other parts of the cat, which had been drawn in such heroic proportions that the painting, when comprehended as a whole, was a most perfect representation of an immense tabby. From the story of that picture we have the expression, "Seeing the cat."

The political economist teaches us that in exchanging the bread of the freezing Dakota farmer for the fuel of the starving Pennsylvania miner, the railroad is as much a producer of wheat and a miner of coal as if it held the plow handles in Dakota or wielded the pick and shovel in Pennsylvania, and the same is true also of the telephone.

That so many of us are no better individuals than we are is explained by the teaching of those psychologists who tell us we are a part of everything we have smelled, tasted, touched, seen, and heard; and our telephone troubles are accounted for if in harmony with the reasoning about the farmer, the railroader, and the miner, we recognize that the inventor, the investor, the builder, the manager, the inspector, and the operator in the telephone business, by bringing all the people within easy speaking distance of each other, are not only farmers and miners; we are also butchers, bakers, and candlestick makers; lawyers and doctors, preachers and teachers; policemen and firemen, defending life and property; messengers of comfort in sickness, sorrow and death; and trustworthy allies of the wooing swain and the blushing maiden of his choice. We are the connecting link or tissue which makes Siamese twins of all the people of the world. As an office boy or messenger increases in value to his employer in proportion to the completeness of his mastery of his employer's business, so we in our business can be and are of value in proportion to our mastery of and sympathy for the aims and plans of those whom we serve.

When I see how, in some of the smaller exchanges "Central" is the clearing house of intelligence, almost the directing ego (and sometimes the egotist) of the community, I ask myself why a well-managed telephone business in a large place could not be so developed as to make itself proportionately just as indispensable to the larger interests it serves, thereby laying the foundation for income not yet dreamed of.

Some people talk as though they thought our business the most difficult or the most peculiar of all the undertakings of man; just as every mother thinks her own babe the fairest, and just as men in every other line of business think theirs the most difficult and the most peculiar. But it is as impossible for all businesses to be most peculiar as for every tree in the forest to be highest. On the other hand there are no two grains of wheat that would appear exactly alike under the microscope, and it would be a most peculiar thing indeed if our business did not have its distinguishing characteristics. Therefore, in seeing the cat as regards our affairs we should find out:

First: In what respects and why our business is like all other businesses; and,

Second: Wherein and from what causes our business differs from all others.

We are like other businesses in that we come under the higher law of commerce, the law of gravity in the business world, as immutable and unchangeable as the law of gravity in the physical universe, by which it is decreed that "Every business that proves unprofitable must perish."

Economy is the absolute law to which our business like all other businesses must submit. The people have shown that they need, appreciate, and will get telephone service—the very best that can be supplied—and at the lowest possible cost. That particular phase of the telephone service which we of this association represent, was born with the promise upon its lips that it could and would furnish the best service—not necessarily at the lowest rate (or rather at a fixed and low flat rate regardless of quality or quantity); but at the lowest cost in proportion to its quantity and quality.

Anyone can point to many places where the telephone plant that is growing and succeeding is being cheerfully paid a higher flat rate than is being rudgingly granted by the same patrons for a competing service that is diminishing and failing. Thus we have practical proof that a low flat rate is not always the cheaper or more desirable or more profitable service either for the patron, the employe, or the investor. On the contrary, it may be and usually is in these days, the expiring gasp of Monopoly's mismanagement, and is a most costly affair for all concerned.

We are like other businesses because in the hum drum of operation, which is the real test of business ability, we are finding losses not mentioned in the promoter's prospectus and profits that were not forseen at the beginning.

Even in the particular nature of our losses and leaks we are very similar to businesses generally, when they were as young in their history as we are in ours. It has been repeated so often that it would be fatal to refer to it as a joke in this presence, but its contemplation need be given that

seriousness it deserves if I remind you that what was once absolutely wasted as useless refuse now amounts to much more than the total of the profits of the meat packers, who are said to be utilizing everything but the squeal of the pig, and who are accused of selling even that to the graphaphone manufacturers who work it up into music for the moving picture shows. With equal enterprise we should find in the football syndicate a profitable market for the kicks so generously bestowed upon our business by the public.

To continue our existence we must emulate those other businesses whose continued existence is due to speedily finding and stopping every leak that manifested itself after their craft put out to sea. For instance, if our collections average three dollars or less per patron while the collections of lighting or water companies average six dollars or more, our percentage of collection expenses will be more than twice as much as theirs if our patrons pay us as promptly as they pay for light and water; but if the public is educated by the acts of the light and water companies to expect as a matter of course that a penalty will be exacted and service cut off for the slightest deviation from promptest payment; and if at the same time we educate the same people to take it as a matter of course that their telephone bills may be paid when the patron pleases, and that the telephone collector must keep right on calling, twice, five times or fifteen times, until the patron is run down as a hunter would chase a fox, and that the collector must then bow down and beg the patron to please pay as soon as possible, after he has finished paying everybody else, our management and our business merits meets with a deserved contempt that is as unnecessary as it is expensive; and that is as certainly fatal as the certainty of the fact that our collecting and accounting cost under such circumstances is inevitably tenfold or 1,000 per cent greater than the percentages of collection cost of the other public service institutions in our towns.

Collecting quarterly in advance cuts out 65 2-3 per cent of the collecting and accounting cost; while collecting yearly in advance cuts out at least 90 per cent, to say nothing of the 100 per cent decrease that would simultaneously be effected in stopping all losses of delinquent accounts.

LESS WASTE AND MORE PROFIT

should be the slogan for the coming years in our business; and with this word "profit" ever uppermost in our minds, we will quickly learn that the patron who either cannot or will not pay in such manner as to minimize the cost of collecting and accounting is one of the most expensive antagonists we have to contend against. His patronage would reduce our profits, not only because he himself would cost us more than he would pay for his services, but because of the fact that by his example he leads others to deteriorate from profitable patrons to expensive annoyances. Where is the manager who, if he has kept tab on his costs, cannot point out cases where he has spent two hundred cents on the dollar in time wasted in enforcing and keeping his record of the collection of delinquent items, if he has failed to cut off service whenever it is not paid for in advance?

The possibility of losing a reasonable dividend through the waste of an unnecessary collection and accounting expense of ten cents per month per patron is a word or thought that is sufficient for the wise. If you do not believe it just figure out what a nice Christmas gift you could make to your common stockholders at the close of this year if you could save ten cents per month per patron on your collection and accounting cost.

Again we should be much more like the older established and successful businesses all about us, whose continued existence is due solely to their having stopped, early in their development, those leaks that were due to neglect and waste of material, apparatus, and time of employes. Some one has said:

"Many a concern protects itself with fire insurance, it safeguards its money by vaults and locks, and by bonding its officers. It entrenches itself with employers' liability insurance and with legal counsel; yet many concerns leave their goods and stock unguarded. They have no check on money wasted in time or material. They carry no protection against, and in fact seem to care nothing about leaks and wastes which they cannot see with their own eyes.

"It can be absolutely asserted that every business loses more money through waste of material than from loss of currency; through watse of time on the part of employes than by accidents to them; through unnecessary wear and tear on apparatus and property generally than by reason of fires or thieves."

Again, we must grow more like other businesses by knocking out the knockers, the loafers, and the soreheads to make room for those who can and will play our game as men play baseball and football. The manager of the largest exchange in our state said to me recently: "If our fellows could only be induced to play the game for results in our business as baseball and football players play their games, nothing on earth could stop us."

It is easier to appreciate this problem and feel the need than to find its solution. I have looked in many directions for help in regard to this difficulty but with little encouragement as yet. Is it to be found in a scheme of profit sharing? It would seem that lack of the corps spirit is about as serious as it could be both in our own and our competitor's camp, and that a move in almost any direction could not be otherwise than an improvement; but who will be the Moses to lead the line of march?

We are like other business in a matter that has been heretofore ignored and that even now, is quite generally overlooked by practically all, namely:

Our properties or plants are not like houses or farms to be rented by the month or year. On the contrary, they are like factories that have been built to deliver a definite product which must ultimately and soon be measured and graded, and sold at prices or rates fixed with more careful and intelligent regard for those four important factors long since accepted as fundamental in all other transactions—quantity, quality, cost to producer, and value to user. Continued definance of such fundamental principles of business would bring the fatal results that it deserves, and few will have time to pity the unfortunates who do the defying. Those who fail to make their selling price proportionate to the quantity and qaulity of their output will cease to operate in our business as in all other businesses. But before we can apportion price to quantity we must have a unit of measure, the minute—message—mile; and before we can grade our quality we must establish a standard of efficiency for the transmission of the human voice.

Those who are sufficiently interested to attend an International convention, or even to read its proceedings, cannot afford to knowingly delay, by any neglect of their own, the moment when the cost price and the selling price for a minute—message—mile of a recognized standard as to conductivity (and all other elements essential to efficient transmission) shall be as generally understood, agreed upon and accepted, by all concerned, as the gallon of the water company; the cubic foot of the gas company; the kilowatt of the electric company; the number one or number two bushel of wheat, corn or oats; or the 95 per cent score pound of butter.

If the present chaotic disagreement of opinion, and disregard of the need of agreement, shall be allowed to continue unnecessarily as to what constitutes the units of quantity and standard of quality the consumer will be in the same condition as the patient whose counsel of physicians cannot agree either as to the disease or its remedy. Unless the patient or his friends has gumption and courage enough left to fire the entire counsel and hire more competent advisers, the wrangling of the doctors will murder the patient

through fright. Our patrons must soon hear some word of agreement from us concerning a unit of quantity and a standard of quality or we are destined to lose either our patient or our patient will lose his patience with us.

If we will take a leaf from the book of experiences proven profitable to our neighbors, we will see that there must first be recognition of the need; then there must be seriousness of purpose or intention; then intention will develop attention, and attention will lead to invention in our business; just as has been the case in the invention of standards of efficiency for the judging of a higher standard of corn and stock; and the scoring of the points of excellence of butter in recent years; improvements which have been brought about by the boys we deserted when we left our country homes disgusted, possibly, with what we thought was the prosaic life of the hayseed; but which has been suddenly shown to be the science of agriculture; a science of sufficient importance to this city in which we meet to make of it in the near future the capital of the world.

We may and must have an agreed basis for scoring the standard of efficiency of transmission as the inspectors now grade grain, stock and butter. Who is blind enough to hope that we might continue running our affairs on the present jack-of-all-trades plan, when our playmates of the cross-roads school days are digging into the chemistry of soils and mastering the causes and cures of diseases of plants and animals?

Finally, our business is like other businesses in that our patrons naturally expect to pay in proportion to the cost and value of what they get from us. How often has a man or woman asking for telephone connections for the first time approached you with the question: "What will it cost to put a telephone in my house?" You answered: "Two dollars per month" (or perhaps less); only to have him repeat the question and increase his effort to find out (that most reasonable of all things) what he would be expected to pay toward the expenses of installing his service. He says: "I know what your rates for service are, but there is no telephone in my house. Your line runs within a block. I don't know how far you would have to string a wire. What I want to know is how much you will charge me for putting a telephone in my house and connecting up a wire to your central. How much will you charge me the first month?" He has exhausted every means at his command in an unconscious effort to indicate to you the fact that being a sensible man he looks at the matter from a common-sense standpoint and therefore expects to pay an installation charge; but you presume upon his credulity by saying: "We will put in the telephone at our expense. The only charge will be the monthly rental rate"—and in so doing you (and we, for we all do it) have destroyed the most important ally of our business, that common-sense view and spirit of fairness manifested as we have just indicated by nine out of every ten applicants who come for the first time to find out what the service would cost them.

And this brings us to the consideration of the points wherein our business differs from other businesses. In addition to unnecessarily suffering from two to tenfold more collection and accounting expense that might and must be transformed into dividends; in addition to the wastes of material and time of employes which may and will by the final administrators of our industry be turned to the reduction of costs of operation and maintenance; in addition to the by-product or auxiliary revenues now ignored which will be turned to profiable accounts as soon as we have gotten better hold of the business end of things; in addition to that tremenedous impetus toward success which will set in when all hands play our game as a team plays ball; and in addition to the fortification of every present weak spot that will be effected when we have an agreed unit of measure and standard of efficiency; in all of which advances we will be paralleling or following in the well-beaten paths of other businesses in general; there must be the recognition and the mastery of those even more important matters wherein we differ from other businesses.

First of all we ourselves must see that thus far, by our own methods, we have not only been ignoring the element of psychology in our business, and thereby forfeiting those advantages which it might have afforded; but we have been unconsciously doing those things the psychological effect of which has been as much in opposition to our own welfare as though done premeditatedly by our worst enemy.

We must proceed with that self-reliance that will command the proper and therefore the higher pay for the quantity and quality of service now being rendered in most places, and the assurance of still better rates as the service is made better; but before we can hope for improved rates we must perfect the economies by stopping those losses, the ignoring of which is responsible for the contempt deservedly heaped upon us by our patrons.

To right these wrong impressions of the public mind, and to lead public opinion aright hereafter, is of such vital importance to the very existence of our business as to serve as an introduction to the differences in general between us and others.

In commenting on the strenuosity of our times the late Senator Hanna is qouted as having said: "Business is the modern form of organized warfare"; and one who knew what he was talking about, said: "War is hell." To hear some people talk (about the business with which this International convention has to deal), might lead us to suspect that both Hanna and Sherman were speaking with direct reference to our particular business only; and that such acknowledged masters of their respective undertakings could not have referred in such glowing terms to any other part of the world's work than our own.

But so far as we can learn, neither of these men could be accused of knowing anything whatever about our business; much less could they have been suspected of having had reference to it in the remarks just quoted. Therefore we conclude that we might as well cheer up, because it may not be true as yet that ours is the worst business on earth, and it is probably that "the worst is yet to come," as we fight our way to the hottest place in the forefront of that modern form of organized warfare which we call business.

And, if any man prefers not to take on more varieties of care, or refuses to intensify his attention and energy in more directions, let him be advised here and now that if we see the responsibilities (of the business end of our business) in the right light, he might just as well climb out early as be dropped out later, but soon. This dropping business is becoming popular and we who are engaged in public service lines may as well begin to expect that we too will be getting ours in due time or earlier.

The idea of business being the modern form of warfare, and war being hell, is used simply to enable us, by the quickest path, to "Come across" from the mystic, the mysterious, the misty or befogged wilderness of imaginary future profits to the hottest forefront of the field of business activity, where the sons of toil, by might and main, are fighting those battles which demonstrate and determine the real gains and the actual losses—the concrete results of what was done yesterday, is being done to-day, and will be done to-morrow.

It is most vitally important first of all that there should be at least a more earnest and determined effort among those of us who think we are at the business end of the business to find out the cost, the necessary rates and all other essentials for the successful management of our affairs. Then, to educate our co-workers, away from the prevailing exaggerated idea of excess of receipts over expenditures; and to a realization of the fact that, like all other businesses, we must curtail every expense we possibly can, first; and when that is done we may have to increase our rates in order to put our business on a level with those

other businesses that are constantly curtailing expenses and expanding incomes. After getting wise ourselves and educating our helpers, there will remain the herculean task of convincing the public that employs us and keeping it convinced not merely that we are laborers rendering service worthy of our hire, but that we actually need and must have the money. We believe no man is at the business end of this business who does not realize that the best way to lead public favor is by giving it the facts. Nor is he at the business end who does not know that in ninety-nine cases out of a hundred the facts are at present overwhelmingly helpful to our cause. Nor is he at the business end who does not perceive that the public is our employer and that our wages or rates will be no more than we can convince the public it ought to pay.

The age of romance and mystery is fast passing away. In its stead we are having more and more of reason and mastery. The minutest islands and the remotest nooks and corners of this old earth at last are being not only rapidly discovered and disclosed by pioneer explorers; they are also being speedily capitalized and sold by promoting exploiters, and vigorously utilized and developed by soldiers of the common weal. In earlier times leaders of thought felt called upon to make matters so plain "that he who ran might read," but to-day, in the business world all are alike students and teachers, and he who runs must read—if he succeeds in running—his business, he must read correctly the signs of the times.

In asking for bids for furnishing military balloons or airships our government is joining in the decree of nations that such former barriers as mountains, seas and fortifications shall no longer define or defend the territorial limits of nations; and the pulling of a telephone wire through the wall into that home which until now has been its owner's castle makes void many of our former notions, laws, and customs; because for all talking purposes it makes the interior of that home as accessible to all as though its walls were removed and it was a part of the commons. The theory that no one may speak within a man's home or castle until after he is invited in, is out of date.

Already the efforts to push the stage coach laws along one step at a time, first to cover the sending of a written message by telegraph and finally to cover the transmission of the human voice by telephone leaves us in suspense in our state until the courts render a decision or two concerning the interpretation of the patched-up enactments which best of jurists say must remain in serious doubt until the questions involved are settled by court decisions. May a telephone company occupy streets and alleys as a stage coach may occupy them? And, if so, can the lack of a franchise prevent occupancy by the one any more than by the other, and when and why?

Is a telephone company a private person or corporation? And, if so, can it, a private person take for its own use and from the use of its owner the property belonging to another private person, firm or corporation? And does not compulsory physical connections by using an entire circuit for a connecting company, to the exclusions of its use simultaneously by its owner, deprive the owner of his property and give his property to the other for the time being?

I have heard able lawyers disagree about this; but agreeing that there was no certainty either way until some new decisions are rendered by the courts. All of which is mentioned merely to lead up to this thought: That the solution of the telephone problems will solve all the questions now perplexing the minds of men—politically, industrially and commercially.

Even then the question will remain as to what a protective tariff should do about talks crossing back and forth between us and Canada; and some day the same question will have to be decided concerning talks to Europe, Asia, Africa and South America.

Our business differs from other businesses in that it must be universal and it must be a unit. We may waive the question as to whether there will ultimately be one system or more than one; because the advocates of every system will agree that when perfected theirs will be universal and will act as a unit. If we are to see the cat; if we are to get a correct view of our business as it is related to other businesses as well as the correct view of our business as a whole, but separated from other affairs, we must recognize aright the natural forces which are to determine the course of events.

Our is the first public utility that, to be perfect, must be universal. We might get our water or light; our mail, passenger or freight service from a dozen different systems; but to be perfect a telephone service must be all inclusive.

Our is the first service of its general nature that is destined to be used in every rural home as well as in towns and cities; and ours is the first interurban interstate and international service for which free right of way was arranged in advance.

In an effort to see the cat, or to grasp the largest view of our undertakings it is important that this last mentioned point should not be overlooked; because.

1st. About thirty-seven and one-half per cent of the people of the United States are living on farms; and enough more live in villages and towns that must serve the farmers to bring the nominal agricultural population up to 60 per cent of our total population.

2d. This 60 per cent of our total population will have a much larger percentage of telephones per capita than the remaining portion of our people; and for the following reasons:

A. They, as a whole, have the greatest need of the service as it is a social as well as a commercial necessity for them; whereas for others it is only a commercial necessity and socially an incidental convenience.

B. They, as a class, are better able to bear the expense

C. They, as a class, are best able to supply themselves if necessary.

D. The public highway provides free right of way for all who seek to serve them and for themselves if they prefer to supply their own service.

3d. This 60 per cent rural population will always use from two-thirds to three-fourths of all the telephones of the country, and while we know Chicago is destined to be the capital of the world, even Chicago cannot afford to remain disconnected from the telephones of this 60 per cent of the population any more than she could afford to refuse terminal facilities to three-fourths of the railroad mileage of the Mississippi valley; and

4th. When we have established ourselves as the satisfactory servants of this 60 per cent of our people these sometimes despised ruralites, well be able to bury all of our tomahawks, put away all of our hammers, turn our spears into pruning hooks and our swords into plow shares.

I can imagine I hear some one saying: That sort of argument will discourage investors, and its author must have little faith in the business; but I am here to say that such is not the case, and I will undertake to prove by actual happenings in the locality where things have been done and are being done along the lines here indicated that your humble servant is such an optimist that he is sometimes rightly accused of being an easy mark, and that this courage to speak up about our own defects inspires confidence that they will be speedily remedied.

We need and must have and will get in the immediate future, larger returns from the increase of our measured service or toll business, as well as from the enlargement and improvement of our exchange service; but we do not deserve nor will we receive this increase until we stop all our leaks.

Stop our exaggeration of profits; stop our warring with

each other; and start our economies; start our real profits and actual dividend payments and start peaceable and fair interchange between companies.

I hear another asking: Is he going to close a paper on the "Business End of the Business" without telling us "how to avoid having the profits eaten up by the demand for extensions of the plant?" The most experienced telephone man I know told me that the wisest man in the business was he who said there is profit to be made so long, and only so long, as new money can be had to put into the business; but I dare to disagree with this statement. It must be confessed that in a country that is just being developed in our line of business, the temptation to extend beyond the reach of the funds originally provided has proven too strong for the great majority of pioneer builders, and I can only say let him who is without fault in this regard cast the first stone at the unfortunates who have built not wisely, nor too well; but too much and too far.

The companies that have demonstrated the best staying qualities in our locality, were not those that had the best construction, nor the best apparatus, nor the biggest backers; but they were those that refused to be tempted to overrun territory that they did not have the means to take care of; and to our mind the assurance of profit is the test of success and the assurance of profit must come from a determination to make the service intensive rather than extensive; sticking to the area originally planned for unless new capital in sufficient quantity is provided for the added undertaking, refusing to encroach upon dividends actually earned, which must not be diverted from the investor's pocket to the newly projected work, except as the investor, after he gets his dividend may himself see fit to reinvest in additional stock for the building of the plant that is to be added.

I sat in the office of the secretary of a neighboring company recently when two men from a neighboring town called in and asked for $1,000 worth each of the stock of that company. They had been investors in it from the start, knew all about it, and wanted more; but that company had not attempted to feed its profits to its extensions. The man who invested $1,000 in new stock to make the extensions would probably have been offering his former holdings at half price if the company had tried to build their extensions out of the profits and thereby neglected to pay him his $300 in dividends.

We believe one small village exchange with its surrounding townships well built, and giving the best of switchboard service to every home and place of business, even though it has but indifferent toll connections on an absolutely fair and neighborly business plan with its nearest neighboring exchanges, is absolutely fireproof against any competitor, and is an investment that with ordinary good business attention will prove as safe and as profitable as investments in other lines of business. We believe also that what is true of a small exchange of the sort referred to is coming to be more and more true of larger exchanges every month; whereas, poor and only partially developed service, in village, town, or city, with expansion as to territory and antagonism as to neighboring companies as the principal characteristic of the management, gives no hope of profit and makes the getting of the money a most difficult proposition.

And now, if I have succeeded with my task, the cat ought to be out of the bag; and I should be permitted to say that if you have seen the cat you understand that I realize that the handling of the "Business End of our Business" is not a "Soft Snap."

It requires the ability and the courage to see all the leaks and stop them; to detect indifference or opposition in employes and overcome it; to determine where public sentiment is, and how far and how and when it can be best moved in a favorable direction; to refrain from overrunning neighboring territory while keeping the neighbors from making invasions; to make a profit, pay reasonable dividends regularly; and in short to make good, with patrons, with employes, and with investors.

If you know any other game in the world that appeals more strongly to every element of manhood and business instinct—show me.

PERSONAL MENTION.

D. S. PARKER, manager of Pomona Valley Telephone and Telegraph Union at Pomona, California, claims the greatest number of telephones per population of any single exchange in the country. The population of Pomona is 8,000 and Mr. Parker's company serves 2,300 subscribers. So far as TELEPHONY knows this showing is the best that has been made. When the Pomona Valley company was started in September, 1902, the Bell company had 380 subscribers. To-day it has but 80 subscribers while the Independent company has nearly thirty times as many. We should like to hear from any of our readers if they know of any company making a better showing than this.

C. C. Baird, for several years with the H. B. Camp Company's New York office, severed his connection with that company on January 1st, to accept the position of sales representative for the McRoy Clay Works, in the Rookery building, Chicago. Mr. Baird will be pleased to get in touch with all old users of McRoy conduits, as well as any others who are contemplating new underground conduit work.

The firm of W. J. Burns & Co., 22 Fifth avenue, Chicago, is now composed of R. E. Burns, son of the late W. J. Burns, and Albert Carliss, who was for some years connected with the American Electric Telephone Company, Chicago. The firm will continue to handle carbon products, magnet wire, tin foil, mica, copper, tinsel and incandescent lamps.

S. P. Grace, chief engineer of the Central District and Printing Telegraph Company of Pittsburg, has been elected a director of the Engineers' Society of Western Pennsylvania. This society now numbers nearly a thousand members and is a very important factor in the industrial development of Pittsburg.

E. C. Brewer, formerly superintendent of the Vote-Berger Company at La Crosse, Wisconsin, has accepted the position of superintendent and traffic manager of the Minot Light and Telephone Company at Minot, North Dakota.

Kurt R. Sternberg, general manager of the Dickinson Manufacturing Company, Springfield, Mass., transacted business in Chicago and vicinity the week of January 11-18, and attended the electrical exposition.

Oscar P. Wodack has been appointed Western sales manager for the Cincinnati Electrical Tool Company with offices at Eighteenth and Rockwell streets, Chicago.

George J. Farnsworth is now president of the Oconto and Bay de Noque Companies, succeeding James C. Brooks, who was their president for twenty-one years.

Harry S. Conover is now junior member of the firm of Geo. W. Conover & Son, 135 Adams street, Chicago, handling a line of electrical specialties.

AUTOMATIC MEN ORGANIZE.

THE sixty Independent automatic telephone exchanges are now affiliated in an organization known as the National Automatic Telephone Association. J. H. Ainsworth, general manager, and F. J. Hanna, superintendent of the Home Telephone Company, of Dayton, Ohio, are the president and secretary of the association, respectively.

Publishers Page

IN THE January TELEPHONY we offered three prizes of $10, $5 and $1 for the best answers to the following questions: "What article or department in TELEPHONY is most valuable and why?" "What article or department is least valuable and why?" In addition to the above cash prizes we offered to send copies of Paul Latzke's industrial masterpiece, "A Fight with an Octopus" to five writers sending in letters next in merit. We regret that space does not permit our publishing all the letters received, as they were very interesting and helpful. The most surprising thing to us was the number of answers received. From almost every state came letters of advice, suggestion and praise for, as one writer put it, "the greatest trade paper in the world." We appreciate the interest and commendation of our readers and will try to merit a continuation of their good will. The following letter, written by E. S. Stowe, of California, was awarded the first prize of $10 in gold:

EDITOR TELEPHONY: The most important and valuable thing about TELEPHONY is its editorial policy of loyalty to the Independent movement. No one has ever questioned the position of the publication, and every telephone man from Maine to California knows TELEPHONY and knows the work it has done in a ten years' campaign against the Bell monopoly. The least valuable department about TELEPHONY is its "Rural Line Districts."

When this letter was received there was no question as to who would receive the first prize. We are proud of our position in the telephone field, and know TELEPHONY has the approval of all loyal Independents. The second prize of $5 in gold was awarded to A. R. Bowers, of Ohio, for the following letter:

EDITOR TELEPHONY: The offer found on the "Publishers' Page" in the January TELEPHONY is frank and candid, and invites an equally frank and candid answer. "What article or department is most valuable, and why?" is the first question. In my opinion, the "Questions and Answers" department is certainly to be regarded as the "most valuable," for the simple reason that it provides a way for telephone men in the field to obtain free the information which they desire on points that are of the highest importance to them in their business. Serial articles like McCluer's "Telephone Reminiscences," Miller's "Scientific Research and Telephone Work," Saenger's "Long Distance Telephone Exchange Equipment" and Manson's "Practical Suggestions" are all interesting and undoubtedly useful, but to the "man who wants to know" the "Questions and Answers" department is an ever-ready and invaluable help.

Cooked-up matter in such a department, such as some journals use to fill space—both questions and answers being prepared by the same hand—is of little value, for the information thus given is either so elementary or so far-fetched that it answers no practical purpose aside from padding columns that otherwise would be lean and scanty. But when men in the telephone operating field know they can ask for light on a knotty problem and get reliable information and helpful advice from an expert—why, then you have a department that is genuinely useful.

"What article is least valuable, and why?" is your second question. If I must be equally frank I will answer: "Wireless Telephony in the Navy." Some may have been interested in this article, but, personally, I could not see how it affected the Independent telephone movement.

I know it takes all sorts of people to make a world; also, that "many men have many minds." It's a good thing, too, that we don't all think alike. If we all liked the same things there wouldn't be enough of anything to go around. I think, however, that TELEPHONY is pleasing many telephone men throughout the country. I know it is well thought of in my state—Ohio. The variety of matter it contains is good and well chosen as a rule.

May your publication live long and prosper! Certainly you deserve the fruits of the optimism which I am glad to note you consistently and continuously preach. If you did nothing else TELEPHONY would be doing good, for I believe in the principle, "Boost; don't knock." Maybe that is why I don't find more things to criticise in the January issue.

L. W. McMullen, of Washington, was awarded the third prize. His letter follows:

EDITOR TELEPHONY: In regard to your contest in the January issue I have selected the "Manufacturers' Department" as the best in this particular issue. What the practical telephone man of today wants is knowledge which can be used in every day work. In referring to this department we have very interesting descriptions and illustrations of private branch exchange switchboards, mercury arc rectifier, pole puller, wire joints, spring jacks, and an especially commendable article with illustrations on block distribution. On account of the word limit to this letter I have had to pass many things in this department which must be of interest to the man who is making this work his profession. The poorest article must be the report of the Kansas convention, which can be of no interest to any one outside of Kansas. If these articles or reports would reproduce or print the papers, such as toll line methods, etc., which are read at or before these assemblys, they would be more beneficial. As it is, I can not see why they are of much interest. I had a hard time finding anything which I could really say was poor, but it had to be done and you witness the results. Referring to Kempster B. Miller's article, he says: "The engineer, or practical man, takes only such things as can be applied to further the progress of human intellect."

I think everybody concerned would be thankful to the publishers if they would get some of the papers which are read before the conventions.

The five other letters receiving prizes follow:

EDITOR TELEPHONY: The busy man in his search for information concerned with a problem in hand may refer to a cyclopedia or textbook, if the subject be an old one, but if it be at all unusual or new he must refer to the current literature as published in the trade and scientific journals printing articles in the group to which the problem belongs. This is especially true of the telephone man, as the art is as yet but meagerly covered in the present day text or hand books, and so, while an authentic index to the published articles which appears annually is valuable, a comprehensive digest appearing monthly will give information which in its intrinsic value could hardly be surpassed by any sporadic article or regular department which might be honored with a place in a high class periodical.

It will then be evident that the "Digest of Telephone Literature" now appearing in TELEPHONY will be almost invaluable, provided it be authentic, comprehensive, concise and complete; the standing of TELEPHONY guarantees all this.

It can, however, be made more valuable by including in the data the name of the publication rather than a number, or a code showing the publication referred to by number so that the busy man for whom the "Digest" is compiled will not have to await the receipt of information by mail when he can use the files which appear in many libraries and reading rooms, of both municipalities and manufacturing or operating companies.—*W. W. Kinsley, Jr., Elyria, Ohio.*

EDITOR TELEPHONY: I subscribed for TELEPHONY in order that I might read each month the advertisements of all the leading supply houses and electrical and telephone manufacturing concerns and that I might take advantage of the practical suggestions and answers to perplexing questions contained in its columns. These departments are the most valuable to me, because they give me exact information on subjects which come up in my every day work and make guess work give way to certainty. They are the best means by which the small exchange operator may take advantage of the knowledge of experts. Your rural line page is probably of the least real value, although it is well worth the space and few of us would like to see it discontinued.—*Otto Dean, Abbeyville, Kans.*

EDITOR TELEPHONY: After carefully reading everything, ads included, contained in the January TELEPHONY, I have come to the conclusion that you have submitted rather a hard proposition to your many readers. There is *so much* that is valuable and *so little* that is not valuable in the January issue (and all others) that it is really very hard for one to decide how to answer your questions.

Your "Questions and Answers" department is, I think, far more valuable than other articles, for in it you have supplied ten men with information that doubtless was very valuable to them and to the companies they represent. "The Telephone Bell" (verse) seems to be the least valuable, for there are no good ideas or suggestions to be derived from it, and, in that respect, it differs so widely from all the other articles that I can not help but think that it is of the least value.—*Leon Spencer, Gainesville, Texas.*

EDITOR TELEPHONY: Your new department, "Digest of Telephone Literature," in the January issue, impressed me as most up-to-date, affording a convenient and effective method of keeping in touch with the latest developments in the art. The entire issue was excellent.—*J. G. Macknight, New Rochelle, N. Y.*

EDITOR TELEPHONY: To my mind the most valuable department in your January, 1908, publication of TELEPHONY is that denominated "Manufacturers' Department. The foundation for this belief is based upon the reasoning that systematic arrangements, artistic effort and terse exposition of the matter presented, coupled with a careful selection and presentation of the most recent and best products upon the market, form a very effective means of reaching the telephone operator.

Better equipment, better service and a wise, economical management of Independent telephone interests must eventually lead to the defeat of the Bell Telephone Company and its allied manufacturing properties.

A journal has nobly performed a great service when it has presented to the trade such valuable suggestions, along the lines indicated in the foregoing paragraphs, as may be found in the "Manufacturers' Department."

"Questions and Answers" for January has failed to come up to its usual high standard of excellence, and appears to be of least value in this edition.

Let us have only practical and clear cut "questions and answers." —*F. S. Leach, Sedalia, Missouri.*

The above letters will give a fair idea of those received. TELEPHONY wishes to thank all the writers who sent letters and to express its deep regret at not being able to publish all letters received.

THE Western Electric Company does not seem to be making much progress in its campaign for business among the Independent operating companies. TELEPHONY has received many protests from its readers, a fair sample being the following from Mt. Morris, Pennsylvania:

Editor TELEPHONY: After reading the letters in the February number of TELEPHONY by A. C Davis of Parkersburg, W. Va., in regard to communications, and circulars from The Western Electric Company, manufacturers of Bell apparatus, I feel like shaking hands with Mr. Davis, and saying to all Independent telephone men, "Do ye likewise." The Western Electric Company is flooding the Independent companies with circulars, pamphlets, catalogues every week, trying to induce them to buy Bell apparatus, and especially striving to get a hold on the rural districts by selling its wares to the farmers' companies with the point in view of eventually making them sublicensees of the Bell company. In regard to The Western Electric Company's correspondence with me I beg to say that I did not get so far along as did Mr. Davis, as I wrote that we were strictly an Independent company and expected to remain so and had no use for Bell telephones, and to please take my name from the mailing list. However, what they said to me in reply I cannot say as I have returned all letters since unopened. As Mr. Davis is one of the foremost telephone men in his state, I think it would be good policy for all Independent telephone operators to follow his example and not in any way patronize the manufacturing department of our common enemy the Bell company.—*L. L. Long, President and Manager Mt. Morris Telephone Exchange Co., Mt. Morris, Pa.*

IN A letter to TELEPHONY an Iowa Independent asks why Independents should connect with the Bell toll or long-distance lines and give the octopus the cream of the business, explaining that the toll business is the most lucrative and satisfactory. It goes without saying that for the above and many other reasons Independents *should not* connect with the Bell company, nor use Bell transmitters and receivers. The tottering Bell monopoly has put its last hope in this scheme of grabbing the long-distance business of the country, but like many other plans emanating from the Bell fountain-head this last one will fall flat. The Independents have eclipsed the Bell in service, apparatus, number of instruments in service, and in organization, and it will be but a few years until the Independent long-distance lines cover the entire country. There is nothing to gain from Bell affiliation, and much to lose.

Once a colored gentleman of good, average character disturbed his clergyman and friends by saying that he did not believe in hell. He was cross-examined and rebuked, but would not change his mind, simply repeating over and over:

"No, I don't believe in hell, I don't believe there's any such place, and I don't believe it because I don't think no constitution could stand it."

That's how we feel about Bell connection. We don't believe in it because we don't think the Independent constitution can stand it.

JAMES MARET of Mt. Vernon, Kentucky, secretary of the Kentucky Independent Telephone Association, in a letter to TELEPHONY of date February 14, says: "You didn't do a thing on report of the meeting of the boys in Chicago. It was simply immense, every word of it from beginning to end. Good luck to you." We appreciate these expressions from our readers. Our convention report was complete and interesting, and we are glad it met with the approval of Independents.

The Potter Telephone Company of Gravette, Arkansas, writes: "We would not know how to do business in an Independent way without TELEPHONY."

The Lapel Telephone Company of Lapel, Indiana, says: "TELEPHONY is invaluable to us."

It is such expressions from readers which please the publisher.

AMONG the telephone men who visited TELEPHONY'S office during the past month were two from the state of Texas. One of them, when asked as to conditions in his section, said that there was not much doing, he was not pushing new work, collections were slow, and after a few more pessimistic remarks of a like character, and a listless handshake, he left the office. The other man came in with a cheery word of greeting, and an expansive smile. He was full of enthusiasm as to the wonderful progress being made in what he called the greatest state in the Union, adding that he was buying a lot of new apparatus, was planning considerable toll line work, and found it difficult to handle the orders which his company received. Of course he was hustling for new subscribers, raising money, building lines, and a mighty busy man, with it all, and very much pleased with the outlook for 1908. He not only talked prosperity, but showed it in his hustling, aggressive way of doing business. He was a man worth meeting, and if all Texans were like him it certainly would be the greatest state in the Union.

The moral to this little incident is obvious.

PLEASE enter subscription to five copies of TELEPHONY for twelve months, commencing January, 1908, to go direct to Messrs. Wynan & Sons Co., Government Collecting Department, Fetter Lane, London, England, and immediately on receipt of your invoice I will remit.—*Arthur F. Bird, 22 Bedford Street, Strand, London.*

I RECEIVE my journal every month regular and think it just the thing for a man in the telephone business. I certainly enjoy the questions and answers as I am a new man in telephone work. Success to TELEPHONY.—*W. D. Lee, Owner Lee Telephone Exchange, Mobile, Texas.*

DOES a manufacturer advertise in TELEPHONY because he has a large business, or does he have a large business because he advertises in TELEPHONY?

The answer to both questions is "Yes."

In The Rural Line Districts

They are stringing the wire from Dudley to Parish for the new telephone.—*Merrill (Wis.) News.*

The rural telephone extension has reached Donnybrook from the north.—*Fargo (N. Dak.) Forum.*

The telephone is now complete in Palmer and is in use.—*Palmer Letter, Big Lake (Minn.) Herald.*

Cornell Bros. will soon place a Farmers' telephone in their respective residences.—*Salem Letter, Lafayette (Ind.) Journal.*

A new telephone office has been established in our town. Mrs. Fannie Shirkey has been employed as operator.—*La Harpe (Ill.) Harper.*

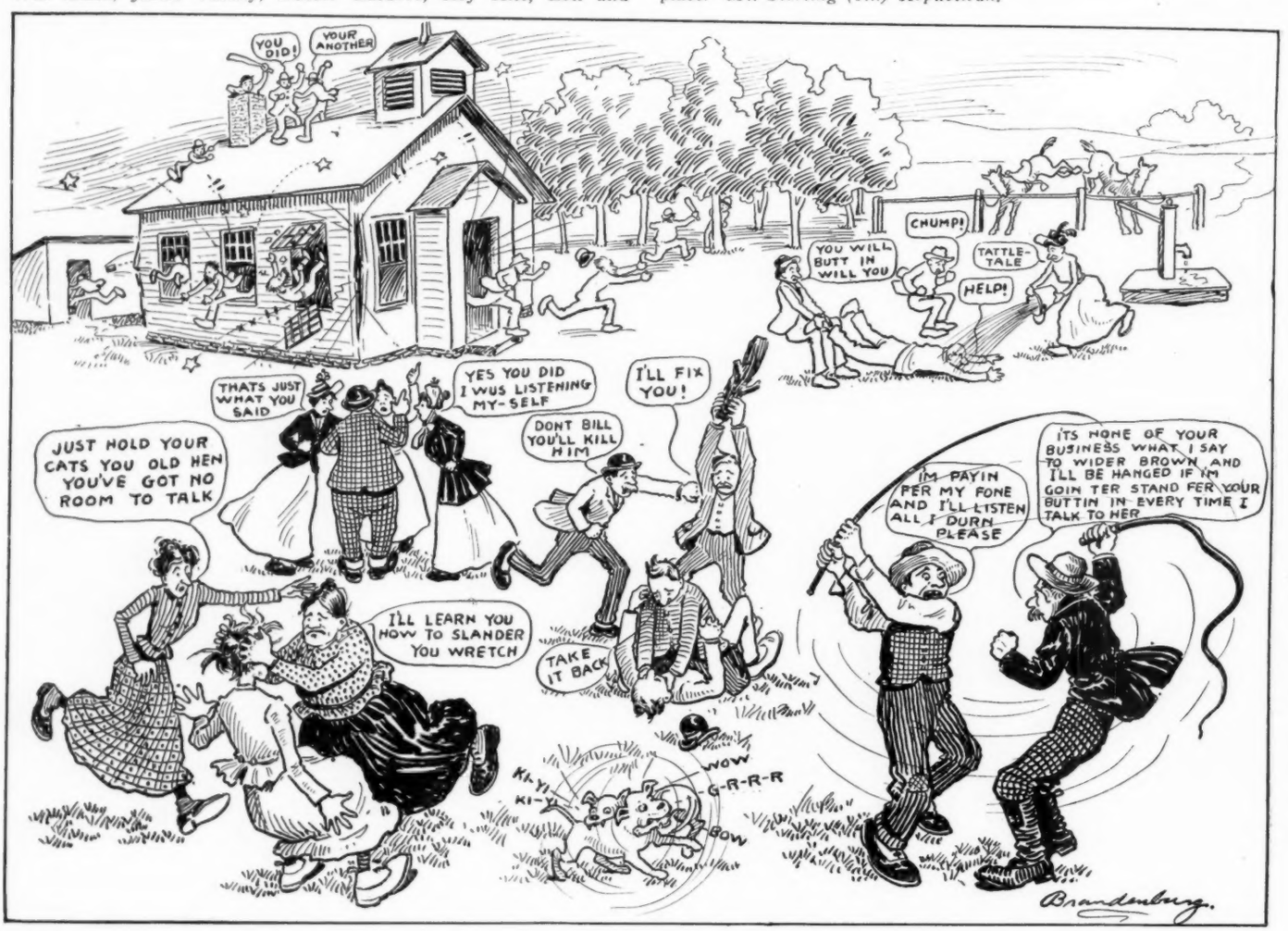
There is a new telephone line being built into Chula, starting at Colonel Dan Darr's place on Rabbit Ridge. The service will extend to Fred Thomas, Arthur Phillips, Charles Foster, Thomas Adams, Will Mack, Jared Varney, Doctor Batdorf, Roy Kile, Lon and Willie Urton. Will Mace is superintending the construction.—*Trenton (Mo.) Tribune.*

Oscar Johnson has been distributing telephone poles the past week with a view to putting his lines in good condition for winter.—*Wells (Minn.) Advocate.*

The Pilot Grove telephone line was divided into two lines last Saturday. The two lines will now be known as the East and West Pilot Grove.—*Blue Earth (Minn.) Post.*

The Waddams Grove Telephone Company will extend their line through Pin Hook, accommodating about ten more families.—*Waddams Grove Letter, Freeport (Ill.) Bulletin.*

All hands turned out Monday to help erect the new consolidated telephone lines out of Hersman. They succeeded in getting up the cedar poles and six pin cross arms as far south as the Wm. Aber place.—*Mt. Sterling (Ill.) Republican.*


YOU DID!
YOUR ANOTHER
CHUMP!
YOU WILL BUTT IN WILL YOU
TATTLE-TALE
HELP!
THATS JUST WHAT YOU SAID
YES YOU DID I WUS LISTENING MY-SELF
I'LL FIX YOU!
DONT BILL YOU'LL KILL HIM
JUST HOLD YOUR CATS YOU OLD HEN YOU'VE GOT NO ROOM TO TALK
ITS NONE OF YOUR BUSINESS WHAT I SAY TO WIDER BROWN AND I'LL BE HANGED IF IM GOIN TER STAND FER YOUR BUTTIN IN EVERY TIME I TALK TO HER
IM PAYIN FER MY FONE AND I'LL LISTEN ALL I DURN PLEASE
I'LL LEARN YOU HOW TO SLANDER YOU WRETCH
TAKE IT BACK
KI-YI
KI-YI
WOW
G-R-R-R
BOW
Brandenburg.

Gossip over a party telephone line, alleged personal remarks about neighbors, and too persistent listening by people on the line have resulted in a battle, caused a serious feud in Kossuth county, and doubtless will end in a long-drawn-out battle in the courts.

Numbers of the farmers in that vicinity are members of a rural mutual telephone exchange, and their houses are connected on the same wire. It is alleged that a good deal of gossiping has gone on over this wire, and that some of the people gossiped about have overheard remarks calculated to arouse their ire. The trouble became so pronounced that it was decided to hold a meeting of the subscribers and adopt rules restricting the confidences to be imparted over the telephone.

But this meeting, instead of helping matters, had the reverse effect. Following heated arguments and acrimonious retorts the gathering ended in a free-for-all fight. The meeting was held in the district schoolhouse, and the fight, which was started here, was continued outside, and a number of blackened eyes and disfigured countenances resulted.

Lifelong friendships have been broken, relatives have become estranged, and it is said that a dozen lawsuits will result from the feud.—*Algona (Ia.) News.*